

# MODERN Machine Shop

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AUGUST, 1943

# Contents

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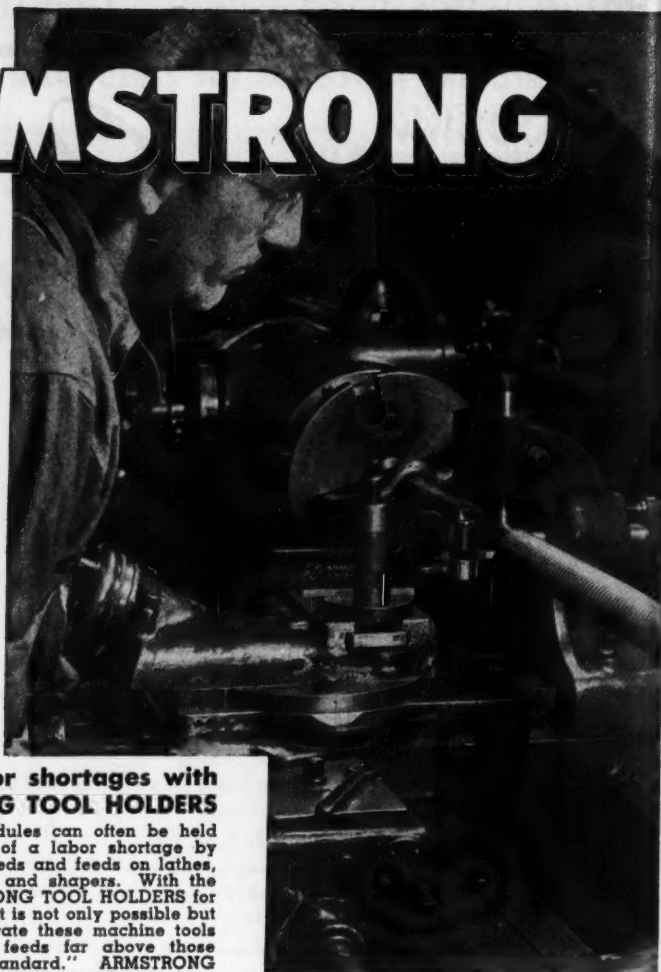
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## CONTENTS

|   |     |
|---|-----|
| Building the 90 MM Gun.....   | 118 |
| By Gerald Eldridge Stedman  |     |
| Rivets that "Explode" Speed Aircraft Production.....                          | 130 |
| Handicapped Workers Do Their Share.....                                       | 138 |
| By Noel C. Cobb   |     |
| Practical Experience in Dealing with Absenteeism.....                         | 150 |
| Tooling for the Automatic Screw Machine, VI.....                              | 168 |
| By Noel Brindle   |     |
| Ideas from Readers  |     |
| —A One-Man Stock Reel, By Chas. H. Willey.....                                | 184 |
| —Assembling Wood Handles to Hand Cranks,<br>By R. Richards .....              | 186 |
| —Chamber for Speed-Testing Grinding Wheels.....                               | 188 |
| —Simple Holder for Drills and Small Cutting Tools,<br>By A. H. Waychoff ..... | 192 |
| —Sawing Attachment for Shaper.....  | 194 |
| —A Fire Hazard—and Method of Elimination,<br>By Arthur P. Schultz.....        | 194 |
| Modern Equipment at Work  |     |
| —Cantilever Bar Increases Radiograph Output.....                              | 200 |
| —Largest Gear Finisher .....  | 205 |
| New Shop Equipment.....   | 212 |
| Catalog Library .....   | 358 |
| Services Directory .....  | 394 |
| Cartoon .....   | 396 |
| "The Last Word".....  | 398 |
| Index to Advertisements.....  | 401 |

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# MODERN Machine Shop

CINCINNATI, OHIO

AUGUST, 1943

VOL. 16, No. 3

## We Present ---

— as the feature article in this month's issue — an outline of the tools and methods employed by the Wheland Company, Chattanooga, Tenn., in building the 90 mm. gun. Written by Gerald Eldridge Stedman, the article is well illustrated with photographs showing the machines and equipment involved in the production of this highly effective piece of ordnance.

— on page 130 — "Rivets that 'Explode' Speed Aircraft Production" — an interesting story illustrating and describing explosive rivets that head themselves when fired by a radio frequency detonator and how they are speeding the production of airplanes and the repair of damaged planes at military depots the world around.

— on page 138 — an article entitled "Handicapped Workers Do Their Share." In this article, Noel C. Cobb, Consolidated Vultee Aircraft Corporation, San Diego, Cal., tells how persons with physical handicaps are being successfully employed in various departments of Consolidated Vultee by assigning such workers to jobs that are best suited to them.

— on page 150 — a discussion on absenteeism — its effects and causes — and practical ways of reducing this menace to war production.

— on page 168 — the sixth article in the "Tooling for the Automatic Screw Machine" series by Noel Brindle. This installment treats of threading and tapping operations, including tools and methods employed in performing such operations, together with ways for keeping tap breakage at a minimum.

— on page 184 — the regular "Ideas from Readers" section, in which are featured several original designs that enable the man in the shop to perform his duties more easily and with greater speed.

— on page 200 — a section — "Modern Equipment at Work" — telling how a shop-built cantilever bar increases radiograph output; also what is said to be the largest standard gear shaving machine in use today and its application to the production of gears ranging from 4 inches in diameter up to 4 feet in diameter x 12-inch face width.

— on page 212 — descriptions and illustrations of new shop equipment and materials.



Fig. 1—Responsibility for Production at Wheland Rests on These Men: (Left) Bill Wilson, Manager; (Center) Charles Wheland, Vice President; (Right) Fred Arnold, Chief Engineer Gun Division

# Building the 90 MM Gun

*An outline of the tools and methods employed on this job by the Wheland Company, Chattanooga, Tennessee*

By GERALD ELDRIDGE STEDMAN

**T**HE 90 mm gun is giving a good account of itself in the present war, for which credit can be given not only to the design, but also to the care and accuracy with which the parts are machined and put together. The Wheland Company, Chattanooga, Tennessee, was among the first to engage in the production of this piece of ordnance, with the exception of the Army Ordnance Arsenal, and were responsible for the development and redesign of many of the patterns, jigs, fixtures, tools and processing methods now in use not only in their own plant, but in the shops of other prime contractors.

The Wheland Company was founded by George Washington Wheland, who first saw the South as a soldier in the Union Army. But the South im-

pressed him so favorably that upon being mustered out of the army at the close of the War between the States he went back to Tennessee, where he became manager of a foundry and machine shop and eventually started the company that bears his name.

Some 70 years later—in 1940, to be exact—Charles W. Wheland, grandson of the founder, obtained an "educational" order for guns from the Government and started tooling up. Before the job was fairly under way he had a new plant under construction with a corps of engineers at work redesigning the tools for maximum production. Some of these tools are presented in this article.

There are 93 pieces in the 90 mm gun, the principal parts being the

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breech ring, breech blocks, rails, support, tube or barrel, and internal components such as cranks, extractors, firing pin, sear, and cocking lever. It is impossible to cover all details of the machining operations in this article, but a good idea of the task can be obtained from the major operations on such parts as, for example, the breech ring. The breech ring is received as a steel casting weighing some 800 pounds. The finish weight, after 35 operations have been performed on it, is 610 pounds.

Leaving out minor operations, the fabricating sequence on the breech ring is as follows: (1) Face top and bottom ring. (2) Lay out for removal of stock on muzzle end. (3) Face muzzle end to layout, semi-finish bore, cut radius. (4) Face breech end, bore load hole, cut  $1\frac{1}{2}$ -inch radius in shell hole. (Two pieces are bored at once on this operation.) (5) Grind and finish to length muzzle and load ends. (6) Lay out the external outline;

breech end. (7) Mill top flat surface, bottom side of breech end, finish mill breech side, mill recoil lug, radii on ring, face of operating shaft lug, radius on same lug.

(8) Lay out breech recess and radii. (9) Rough slot breech recess, front face, and side wall. (10) Shape front face of breech and side walls. (11) Spot front face recess. (12) File side wall. (13) Finish angle on rear, face breech recess, finish angle sides of breech recess. (14) Spot angle on rear face of breech ring and on sides. (15) Mill right and left sides and rough mill right and left rail seats and radii. (16) Mill opening into shell hole and radius of end shell hole clearance. (17) Mill radius around muzzle end. (18) Lay out, drill and ream shaft hole. (19) Drill spring case hole, ream, countersink, drill recoil hole, tap. (20) Mill radius on operating shaft lug, mill shaft recess, opening top breech recess, spring case lug, angle in lug, two radii.

Fig. 2—Boring Gun Barrels for 90 MM Guns





Fig. 3—The Barrels are Reversed Through the Headstock Spindles to Permit Boring and Reaming the Powder Chambers

(21) Finish bore upper shaft hole (tolerance 0.001 inch). (22) Mill 15-degree angle on top recess and 1-inch ring. (23) Finish right and left rail seats. (24) Mill out lightening pocket in rail seats. (25) Shape out clearance pocket for breech block crank in ring. (26) Cut cocking lever slot. (27) Hand scrape rail seats. (28) Hob internal thread in ring. (29) Sector thread. (30) Drill extractor plunger holes, drill and tap two holes for extractor tray. (31) Drill and ream hole for key; drill hole for leveling plates. (32) Form angle of leveling plate holes; assemble mill seat for key retainer. (33) Mill extractor pocket. (34) Drill and tap securing holes for rail; drill rivet clearance; drill plunger holes; drill cocking lever holes. (35) File and burr ring and radii to size; burr surfaces smooth. (36) Tap retainer holes; scribe leveling plates;

stencil and finish.

The sequence of operations given above covers only one part, but will indicate the amount of work necessary to complete an ordnance piece of average size.

The breech block is received as a cast double billet with a pierced hole. The rough weight of the billet is 238 pounds, but after 40 machining operations have been performed on it, it weighs approximately 98 pounds. The tube, or barrel, is received at a rough weight of 2,111 pounds and its finish weight, after 15 operations, is 1,465 pounds.

The barrels for the 90 mm guns are bored in the lathes shown in Fig. 2. The lathes are known as "tell-tale" lathes because they are equipped with electrical contacts which indicate when the tool is in contact with the work, regardless of the depth of in-

Fig. 4 — Hobbing Thread on Breech End of Tube

section of the tool into the bore. Considering that the barrels are long, this device is important in enabling the mechanic to work to accurate dimensions.

The powder chamber in the breech of the gun is turned and bored in the lathe, as shown in Fig. 3. Lathes with special headstocks are required for this operation, due to the fact that the barrel is reversed and inserted backward through the headstock spindle—which must be of sufficient diameter to take the barrel.

The overhanging end of the barrel is supported in a special steadyrest. The powder chamber is bored with a single-point tool, then reamed with a bar reamer held in a turret.

The operation of boring the taper in the powder chamber was originally performed in three steps, using form reamers. However, it was necessary

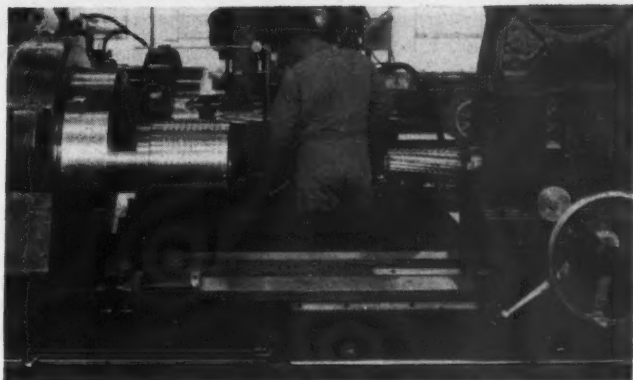
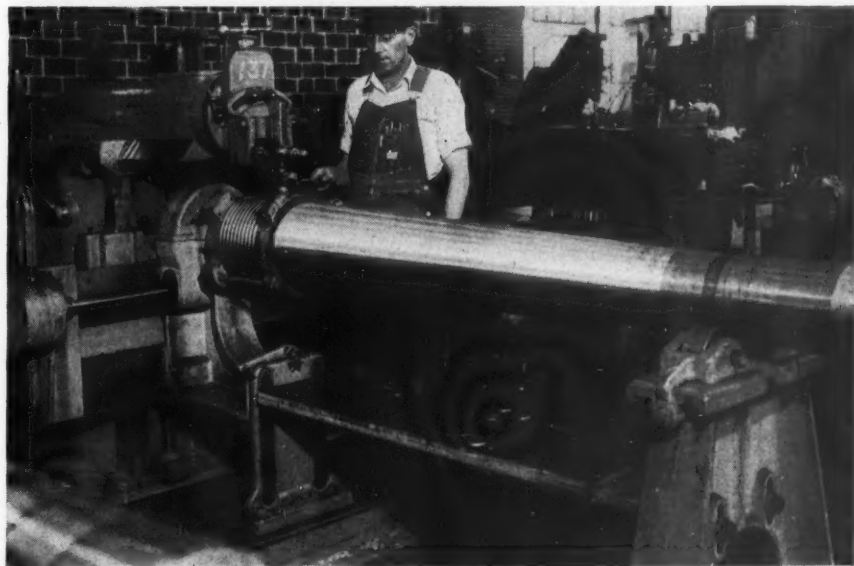


Fig. 5—Using Shaper and Special Worm-Gear and Wheel Fixture for Sectoring Thread on Breech of 90 MM Gun



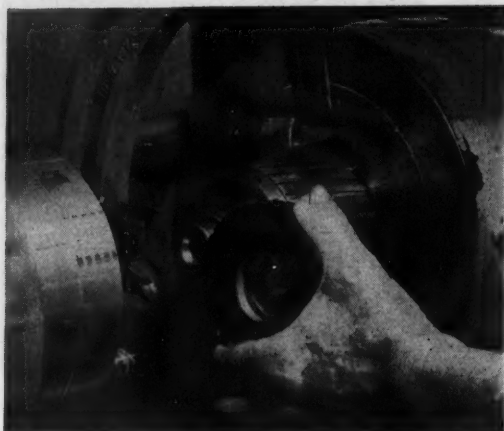


Fig. 6—Broach Head and Cutter for Broaching Rifling in Tube for 90 MM Gun. Each Cutter Carries One Set of Teeth; Thus 34 Cutters are Required to Complete a Tube

to take out a great deal of excess metal, which not only was hard on the tools but took what to the Wheland officials seemed to be too much time. Accordingly, Fred M. Arnold, chief engineer of the Wheland gun division, designed a boring arrange-

ment which works off the taper attachment on an American 36-inch lathe. With this tool it is possible to bore a taper hole within a few thousandths of an inch of the finish dimension.

In the 90 mm design the tube is joined to the breech ring by a system of interlocking threads. Quarter points of the thread are sectored to match with similar sectored threads on the mating piece. The thread is hobbled on the tube by the use of the machine shown in Fig. 4, several of these machines being necessary to turn out the required production.

Fig. 7—Milling Extractor Pockets in Breech Ring, Using Cincinnati Hydro-Tel Milling Machine

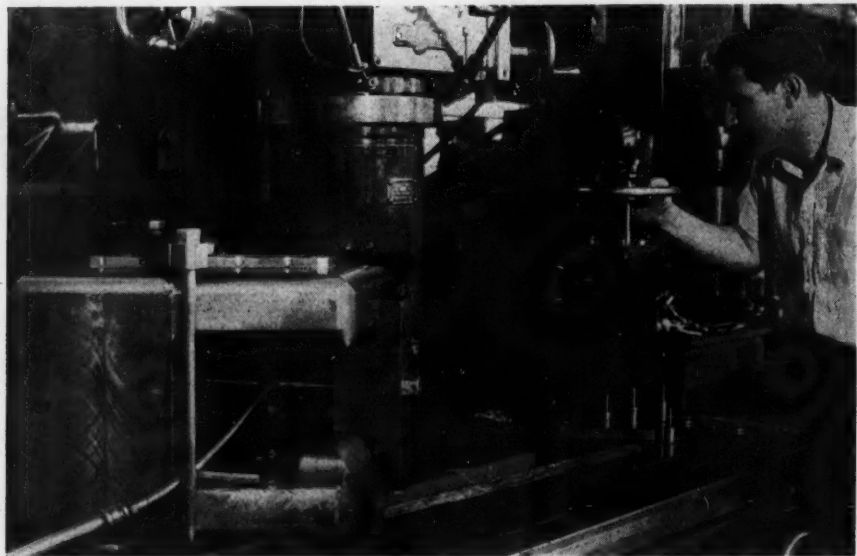
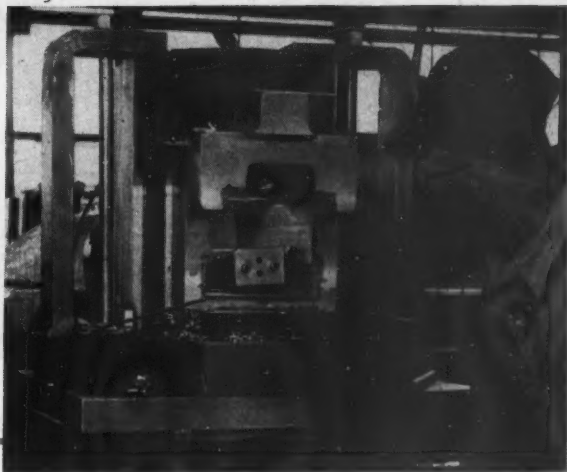


Fig. 8—The Breech Recess is Machined in the Shaper, Using an Extension Toolholder

Milling these threads on the breech is, of course, an operation of great accuracy. When the tube and breech are locked together by slipping the breech over the threaded end of the tube and giving it a quarter turn, the two parts must fit perfectly with bearing on all threads. In order to obtain a satisfactory fit a tolerance of 0.001 inch is allowed on the bearing.

The sectoring operation on the thread is performed in a Rockford Hy-Draulic Shaper, equipped with a special fixture to hold and rotate the tube. The machine is shown in Fig. 5. The standard machine table was removed to make room for the fixture, which not only serves as a chuck to hold the tube for machining, but also contains a worm and gear arrangement by which the tube is revolved as the cutting progresses. The worm is attached to the regular feed rod so that it can be actuated by the feed mechanism. The free end of the tube rests on a roller support which holds the tube at the exact level required. Using a single-point tool, quarter sections of the thread are cut away, leaving the sections necessary for interlocking with the corresponding thread in the breech ring.

Rifling the barrel, which took many hours with the old "Whitehead" cutter used in past years, is done in the Wheland plant in three hours. For this operation a LeBlond broaching machine is used, together with a set of 34 broaches for cutting the 32



grooves. The broaches are driven hydraulically under a pressure of 300 pounds to the square inch, and the driving bar is forced to revolve to the pattern of a spiral groove which is an accurate duplicate of the spiral of the rifling.

Each of the 34 broaching cutters is a steel disc, as shown in Fig. 6. Each cutter carries one set of teeth, the teeth on each cutter being a couple of thousandths larger in diameter than those of the preceding cutter. Thus the cutters have to be changed between cuts until all 34 of the cutters have been forced through the barrel. The final cutter finishes the rifling to the required dimension.

One of the more interesting operations on the breech block is performed in a vertical milling machine. Using a  $\frac{1}{8}$ -inch end mill, both sides of the block are machined in a side-cutting technique. For this operation the block is held in a fixture that permits an angular slot to be milled on both sides in one operation.

To machine the extractor pocket in the breech ring, trunnion grooves in the breech block, pockets in the gun rail, and allied operations, the Cincin-

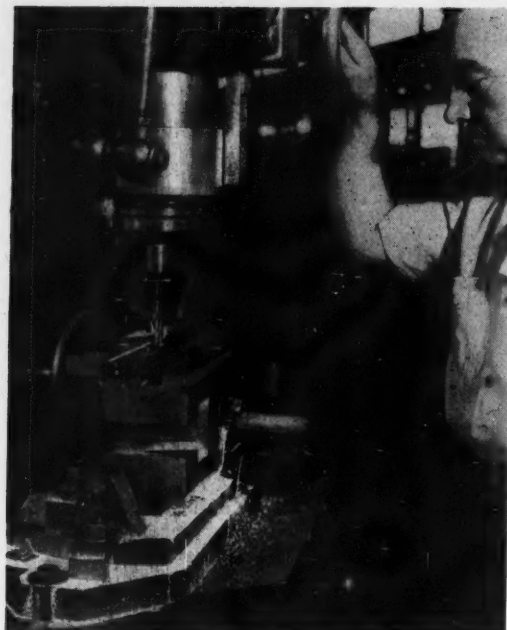


Fig. 9—Milling Cocking Lever Slot in Breech Ring for 90 MM Gun

nati 28-inch Vertical Hydro-Tel Milling Machine shown in Fig. 7 is used. The machine is equipped with an attachment which consists of a completely automatic tracer control mechanism which makes it possible, by using a pattern of the finished workpiece, to accurately duplicate the finish dimensions and contour of a workpiece automatically.

With a cutter in the machine spindle and a workpiece in position in the fixture, the pattern is locked in position on the attachment so that, as the tracer finger follows the contour of the pattern, the cutter duplicates the movement of the tracer finger and removes the stock from the workpiece, finishing the workpiece to the exact size of the pattern.

The control mechanism is so designed that, although the pressure of the tracer finger against the pattern is comparatively light, the cutter is not swerved from its path by pressure

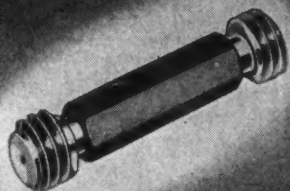
against the workpiece even though the stock on the workpiece may be quite heavy.

The operation in process in Fig. 7 is that of cutting a slot in the breech block to act as a cam to actuate a lug on the extractor which, in turn, fits into an accurately-cut pocket in the breech ring. When the breech block is raised and lowered in the ring, this slot functions to extract the shell. The use of the Hydro-Tel Machine, with the duplicating attachment, makes it possible to machine the blocks at the maximum speed and with perfect accuracy.

The illustration Fig. 8 shows the operation of cutting a recess in the breech ring, which is done in the shaper. Inasmuch as this is an internal operation, an extension toolholder is used, carrying a single-point tool. The design of the toolholder is such that the tool can be clamped into it so that any part of the internal surface of the workpiece can be reached—top, bottom, or either side.

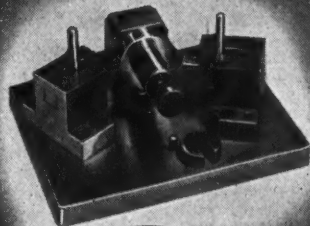
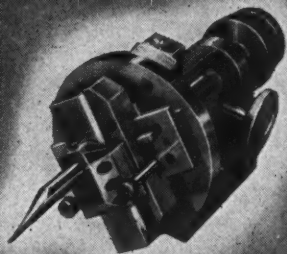
The operation of milling the cocking lever slot in the breech ring is shown in process in Fig. 9. The job is done with a vertical milling machine and the workpiece is held in an indexing fixture, which makes it possible to finish the piece to the required contour and dimensions.

One of the most useful machines in the shop is the P & W Keller Profiling Machine shown in operation in Fig. 10. The cocking lever, which has an intricate contour, is finished in this



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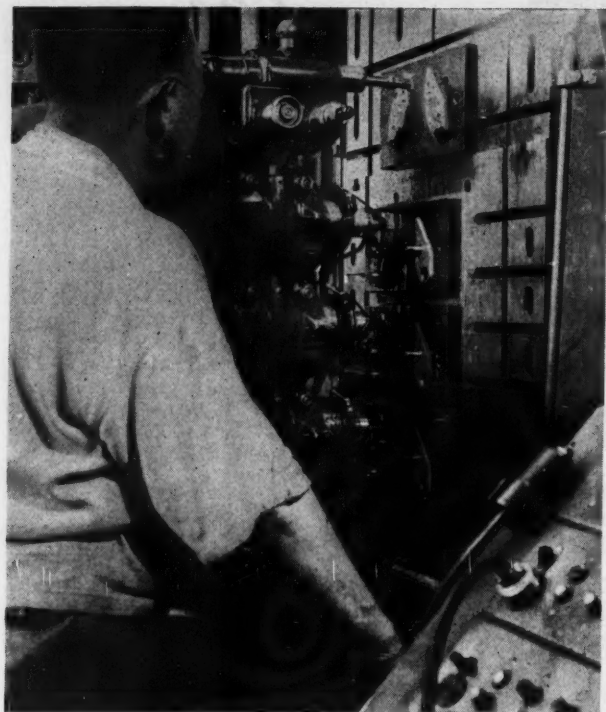


Fig. 10—Profiling Extractors in P & W Keller Profiling Machine. Three Pieces are Finished Simultaneously, the Three Cutters Being Guided by the Stylus

machine to within limits of 0.005 inch. The machine has three cutter spindles in addition to the spindle that carries the tracer finger; thus three workpieces are finished simultaneously to

limits of accuracy which are determined by the accuracy of the pattern. The tool spindles are electrically controlled, making hand feed unnecessary. The parts in process in the machine as shown in the illustration are extractors for the 90 mm gun. As can be seen, the tracer finger is at the top, with the three cutter spin-

dles in vertical alignment below.

It is due to such tools as these that America is able to out-produce the Axis nations, both as to quality and quantity.

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Add to the many new uses for glass the marvelous use of glass springs for stresses up to 2,000 lbs. per square inch. In many respects glass is better than steel for this purpose. It is more truly elastic, retains its elasticity over a broader temperature range, is immune to acids and apparently to fatigue also. One glass spring showed no signs of failure after 8,000,000 deflections in a sulphuric-acid mist. After the war the manufacture of glass springs will become an important adjunct to industry. (Ohmite News)

**Poster for Shippers.** A full color bulletin-type poster outlining the important things to watch when strapping materials and products for shipment has been prepared by a committee consisting of representatives of several strapping companies. Copies of this 19½ x 28½-inch poster may be obtained free of charge upon request to any of the following companies: Acme Steel Co., Chicago, Ill.; Brainard Steel Co., Warren, Ohio; The Gerrard Co., Chicago, Ill.; The Signode Steel Strapping Co., Chicago, Ill.; The Stanley Works, New Britain, Conn.; C. Tennant Sons & Co., New York, New York.

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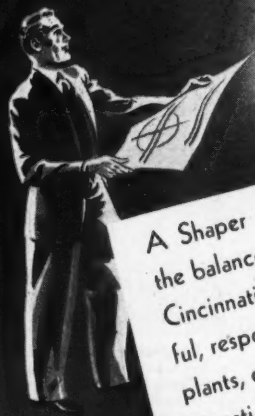
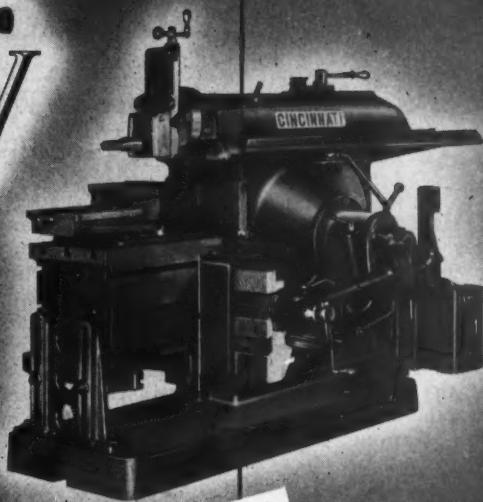
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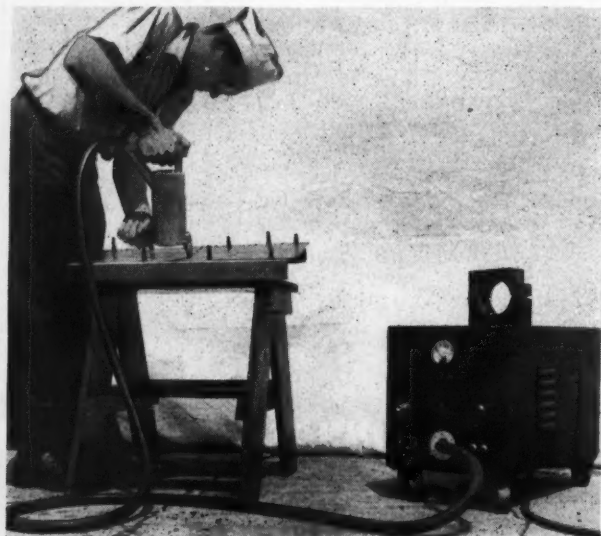
**E**XPLOSIVE rivets that head themselves when fired by radio are speeding the production of airplanes and the repair of damaged planes at military depots the world around.

Heat applied to the rivet head detonates an explosive secreted in a cavity at the end of the shank. The explosion expands the charged end of the shank, forming a "blind" head

and setting the rivet. The operation is performed with greater ease and speed than is possible by any other mechanical means.

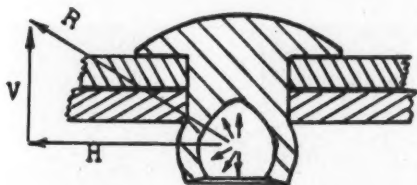
Introduced two years ago by Du Pont, explosive rivets broke a factory bottleneck in fastening airplane sections where riveters could work only from one side. They are installed at a rate of 15 to 20 a minute, as contrasted with two to four a minute for most "blind" fasteners.

Repair of a bomber  
or pursuit plane with



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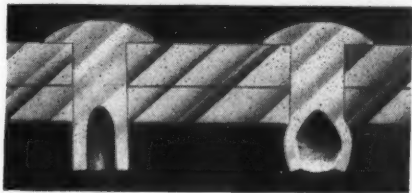
a gash in its wing or bullet holes in its fuselage now is achieved in a few hours, instead of days, and without dismantling the plane. Explosive rivets secure a patch over the damaged section, enabling the riveter to work when only one side of the section is readily accessible.



The Force of the Explosion, Directed Toward the Machine-Formed Head, Tends to Draw the Assembled Parts Together while Forming a Head on the Rivet

Heat necessary to installation is applied by an electric riveting iron both in factories and at repair fields. Recently radio-frequency energy has been used to set off the rivet's charge. This latest method is adaptable only to large scale production.

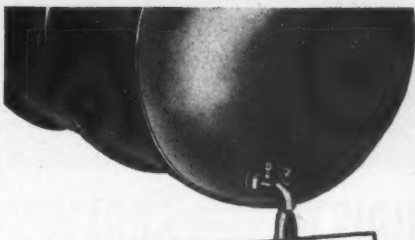
The iron is a specially designed electric tool with a silver tip, known as



Cross-Section View of Two DuPont Explosive Rivets. The Rivet at the Left is Cut Away to Show Position of Charge; the One at the Right Shows the Rivet after Firing

the Du Pont Riveting Iron. It explodes the charge and sets the rivet about  $1\frac{1}{2}$  to  $2\frac{1}{2}$  seconds after being touched to the rivet's head. The riveting gun or iron weighs about seven pounds.

The radio unit, developed by engi-



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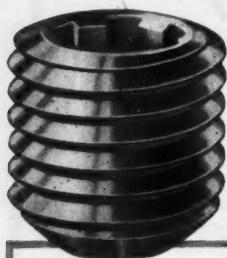
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Many sub-contractors are finding "Bristo" written into specifications from prime war contractors. Using them, they are learning how the multiple-spline design provides greater strength, permits more tightening force even on screws as small as No. 4 wire size, and facilitates fastening at hard-to-reach points. Assembly troubles such as reamed-out sockets are eliminated, thus increasing production.

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- 1 Splines, like gears, provide faster, easier transmission of rotary power.
- 2 Splines permit tighter setting, maximum resistance to vibration.
- 3 Splines "grip" wrench, permit removal without damage to socket.

See THOMAS' REGISTER for Complete Facts, List of Product Applications.



127 Bristo Road  
Watertown, Conn.

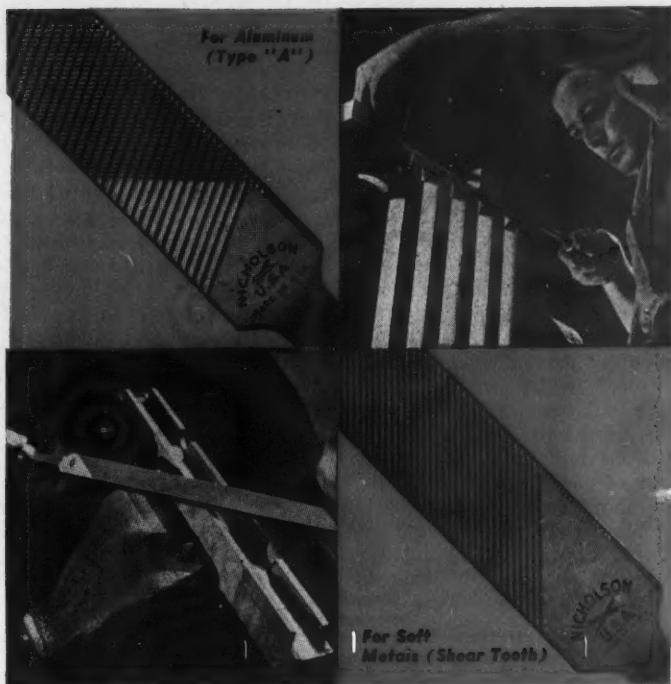
neers of Radio Corporation of America and Du Pont, comprises an oscillator together with a specially prepared applicator to concentrate current directly into the rivet head. As current is induced in the head, the heat it creates fires the charge.

This method assures instant control



Applying an Electric Riveting Iron to the Head of a DuPont Explosive Rivet. When the Rivet Charge is Heated to 130 Degrees Cent., the Charge is Exploded and the Shank Expands, Forming a Barrel-Shaped Head on the Blind End

of temperature in the firing tip, eliminating time consumed in heating an electric iron to operating temperature and in frequent changes from one tip temperature to another. Radio energy prolongs perceptibly the life of the firing tip. The tip is always cool, an important safety factor. It can be



## The right file speeds the job, cuts the cost

Nothing has ever so sharply emphasized the value of special tools for specific jobs as the mass production programs of our huge war industries.

They justify, conspicuously, this company's far-sighted pioneering in designing many of the special purpose files which today are speeding up thousands upon thousands of individual filing operations.

Besides supplying large quantities of the Nicholson or Black Diamond Special Purpose Files shown above,

Nicholson has recently developed a special file for tank armor-plate fitting; and another for magnesium filing in incendiary bomb manufacture. . . . Nicholson file engineering never rests—and quality manufacture is never lowered. *Send us your filing problems.*

### Send for "FILE PHILOSOPHY"

This 48-page Nicholson book tells more about the above-illustrated and other files; about proper use and care of files, etc. **FREE.**

**Nicholson File Co., 48 Acorn St., Providence, R.I., U.S.A.**  
(Also Canadian Plant, Port Hope, Ont.)

# NICHOLSON FILES

FOR EVERY PURPOSE

NICHOLSON  
U.S.A.  
MADE IN U.S.A.

used for any kind of rivet head.

The rivets are made of an aluminum alloy of varying diameters and sizes to meet structural requirements. They are of the modified brazier head and counter sunk types, the latter permitting the flush riveting required by modern high-speed planes. The rivets, installed in the "age-hardened" condition, do not require refrigeration after heat treatment, so necessary with solid rivets in the same alloy. In shear and tension, these rivets develop values which are approximately the equivalent of driven rivets of the type now most widely used. They weigh only about one-fourth as much as generally used blind fasteners.

The Du Pont Rivets may be used without fear of serious injury. However, they should be handled with reasonable care. Numerous safety tests have indicated they will not detonate in mass and are quite insensitive to shock and friction. As would

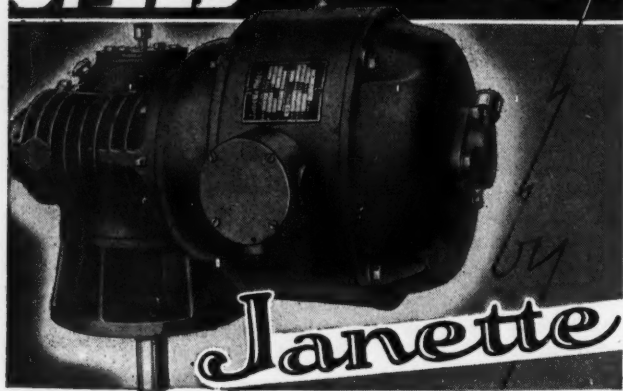
be expected, fire or high heat of any kind will set them off.

Extensive experimental work by the Explosives Department of the Du Pont Company, supplemented by tests of the rivets on airplane production lines, preceded introduction of the rivets. Engineers expect the invention to have wide applications in industry at large, and to effect radical changes in riveting methods and structural designs. Explosive rivets in still larger sizes, and in other metals, including steel, are a possibility, helpful in a peacetime economy.

They are most important now in airplane construction and repair. As many as 800 fastening points in an all-metal pursuit plane up to 10,000 in the largest all-metal bomber are accessible only from one side. Many portions of airplane structures are totally or partially inaccessible from the rear, requiring fasteners which can be installed from one side.

## SPEED REDUCERS

## For SLOW SPEED DRIVES



Speed reducers provide a practical, economical, quiet, efficient, compact, low maintenance cost method for obtaining positive slow speeds from high speed motors.

Janette reducers are built in either motorized or motorless styles, with foot or flange mountings, and can be furnished with Janette ventilated or enclosed motors, designed for standard and special applications.

**WRITE TODAY** for your copy of our catalog—100 pages of complete information on 47 speed reducers, 1/50 to 10 H.P.

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556-558 W. Monroe St. Chicago, Ill.



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TEAM**

Machines and cutting tools  
— this is industry's crack  
combat team. Only with  
first quality tools can you  
show significant results in  
war production!

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## SOLDIERS OF STEEL ON 24-HOUR DUTY

Day and night, pausing only for changes, repairs or maintenance, countless thousands of machine tools—"Soldiers of Steel" in the army of production—are turning out armament, equipment and supplies, for Victory. For them, there is no rest, no relaxing of effort. They must "keep on the job."

In thousands of these tools, by practically every representative machine tool builder, **NORMA-HOFFMANN PRECISION BEARINGS** are "standing the gaff" of this continuous service—and contributing accuracy, rigidity, speedability and dependability under the most gruelling conditions ever imposed upon machines.

*Write for the Catalog. Let our engineers help you.*

★ **"NORMA-HOFFMANN"** ★  
**PRECISION BEARINGS**

BALL, ROLLER AND THRUST

NORMA-HOFFMANN BEARINGS CORP'N., STAMFORD, CONN. . . . . FOUNDED 1911  
TO WIN THE WAR—WORK—FIGHT—BUY WAR SAVING BONDS





PHOTO COURTESY BELL AIRCRAFT CORP.

## OUTSTANDING PERFORMERS



In aircraft plants from New Jersey to California, "American" Hole Wizard Radials are proving their reputation as outstanding performers on exacting jobs. On drilling, tapping, boring and facing they are hanging up records for quantity and quality production — records that are making it possible for American planes to overwhelm the Axis in every branch of aerial warfare.

**THE AMERICAN TOOL WORKS CO.**

LATHES  
CINCINNATI

RADIALS

SHAPERS  
OHIO

THE AMERICAN TOOL WORKS CO.  
CINCINNATI, U. S. A.

# Handicapped Workers Do Their Share



Ben C. Baker, Totally Blind in One Eye, Nevertheless Produces as Much as Persons with Normal Vision. A Former Seasonal Crop Worker, He Now Works in the Waterseal Department at Consolidated Vultee Aircraft

*Physical Limitations No  
Bar to Full Production  
if Jobs Are Fitted to  
the Workers*

By NOEL C. COBB

Consolidated Vultee Aircraft Corporation

**B**OMBERS bound for the fighting fronts will take to the air in shorter time since the Consolidated Vultee Aircraft Corporation at San Diego, California, opened its doors of employment to applicants with physical limitations, and a new vista has been opened for physically handicapped persons.

These men and women, now freed from sitting on the war's side line, are happily working eight hours a day for six days a week building much-needed Liberator B-24 bombers and Catalina and Coronado flying boats. They take pride, too, in the fact that no jobs have been created especially for them. They work at regular jobs

and are turning out production that will compare in both quality and quantity with the output of the normal workers with whom they work.

In the past, companies such as Consolidated Vultee have been compelled to turn down many applicants because of physical defects. Increased production schedules have, however, brought increased demands for manpower. Through careful job evaluation from the physical standpoint the company has been able to employ men and women who never thought that they would some day be able to help build airplanes.

Under the job evaluation plan in operation at Consolidated Vultee Aircraft Corporation, workers are classified into four main groups: (1) those

capable of heavy sustained labor, (2) capable of moderately heavy labor, (3) light labor, and (4) very light tasks. Variations under these groups classify defects such as sight, hearing, coordination, nerve stability, chronic illness, and so on.

The intricate placement control sys-



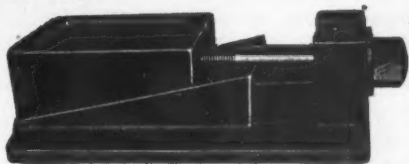
Mrs. Evelyn Barkdull, Mother of Three Small Children, has Successfully Overcome the Effects of Infantile Paralysis and Has Taken Her Place in the War Production Army at Consolidated Vultee Aircraft

tem used to assign workers to specific jobs at Consolidated Vultee was evolved under the supervision of Dr. A. C. Dick, the company's chief surgeon, and Thomas W. Wills, staff assistant, Dr. J. L. Barritt, assistant chief surgeon, and E. R. Williams,

## Accuracy Begins at the Base with Leveling Jacks



Scientifically designed leveling jacks for any equipment which demands extreme accuracy.



Standard Size No. 100A (base 6" x 9", average height 2 3/4", top section 4" x 4 3/4") will fit most requirements.

Extra large base and screw assures permanent accuracy. Angular faces are finished.

SPECIAL SIZES SUPPLIED ON REQUEST.

**IMMEDIATE DELIVERY**

**JURZEK  
MACHINE & ENGINEERING CO.**  
2303 HILTON RD. FERRISDALE, MICH.



Mrs. Hazel Eaton, Who has Lacked the Sight of One Eye Since Birth, Trained at Consolidated Vultee's Pre-Factory Training School and is Now Working on Coronado Flying Boat Hull Fittings. Her Husband is a Navy Man, Now Somewhere in the South Pacific

employment office director of special services. Their attitude on the problem of the applicant with physical limitations is best summed up as one of interest not in what he can't do . . . but, rather, what he can do.

From a job re-evaluation survey it was learned that 60 per cent of the jobs in the plant are within the physical capabilities of persons with a severe visual defect in one eye. Only three per cent could be done by those with but one arm. But 50 per cent were within the capacities of men and women who had full use of one arm and partial use of the other. Ten per cent were available to those limited to jobs that could be done while seated.

To make this survey, said Williams, "I first had to determine the different categories of physical fitness in relation to job capacity and then I had to evaluate each job in the light of the degree of physical fitness re-

quired to perform the task."

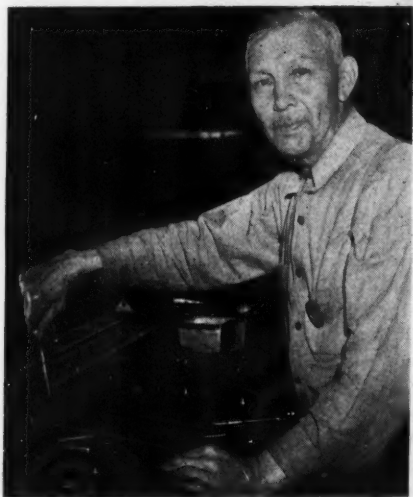
Certain basic classifications of physical fitness were determined by working closely with Dr. Dick and his staff. After this every department at Consolidated Vultee was surveyed and an effort was made to determine if persons falling within any of these classifications could be fitted into a job building bombers.

It was revealed from this, for instance, that persons with sensitive skins could not perform efficiently in the paint shop or anodizing rooms. Also determined was the fact that a person lacking a finger or two need not be ruled out from handling almost any job at the company because of this deficiency. Today, this is not even considered a handicap.

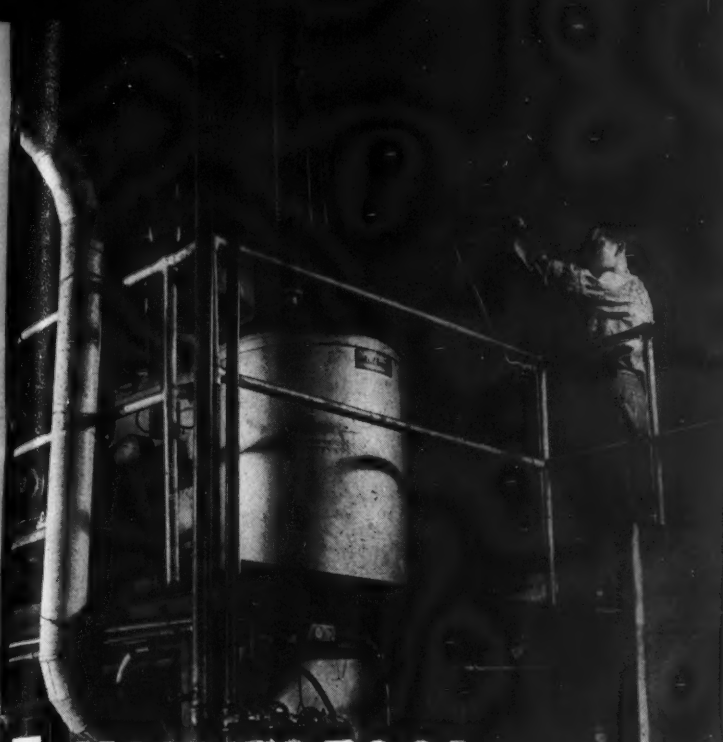
Every production operation was evaluated on the basis of what limbs were essential, what degree of sheer physical strength and endurance was required, and what sensory powers were indispensable.

Paramount in consideration of these

William Ossiginac, Partially Deaf, Performs as Efficiently as Anyone with Full Hearing as a Waterseal Fabricator at Consolidated Vultee. For Many Years an Iron Molder, He is a Full-Blood Ottawa Indian



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*Broaches being  
lowered into the  
furnace for tem-  
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**ILLINOIS TOOL**

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THE HUB OF AIR TRANSPORTATION**

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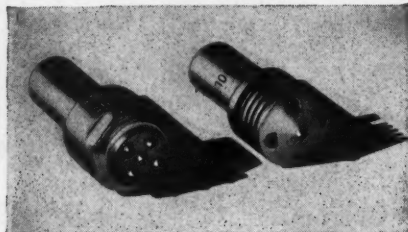
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● Modern facilities, technical skill and practical experience in the application of heat contribute greatly to the outstanding performance of Illinite cutting tools. Through precisely controlled heat treatment, each tool is rendered structurally strong, permanently accurate and able to give exceptionally long service. These effective qualities, which assure increased economy and efficiency in production, are important reasons for calling in "Illinois Tool."

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**HOBBS • BROACHES • SHAPER CUTTERS • GEAR CUTTERS  
MILLING CUTTERS • GROUND FORM TOOLS • SPECIAL TOOLS**

# DIAMOND TOOLS



SMITITE

STA-KOOL

The STA-KOOL Single-Point Tool is equipped with internal coolant ducts and external cooling fins to quickly dissipate the heat generated in the nib, thus prolonging tool life.

SMITITE Diamond Tools employ a sintered metal setting which firmly holds the stones till they are completely consumed, without resetting.

Catalog on request.



factors, of course, is the rendering of a verdict whether the physically impaired are not only capable of performing the operation, but also whether they will be able to perform it with safety both to themselves and their fellow workers.

A special problem is presented, for example, in the blind. In the opinion of those who made the survey, there are jobs upon which the blind would



John L. Hoerber, Suffering From High Blood Pressure and Heart Condition, Still Manages to Contribute to the War Program by Serving as Tool Round-Up Man at Consolidated Vultee

be able to work. However, in a large plant, they must encounter unusual hazards in passing through congested shop areas on the way to and from their stations.

Now being studied as a possible answer to this problem is a program which features the setting up of a remote shop, housing a sub-assembly operation which the deft-fingered blind can capably handle. In other words, since the blind can't come to the job,

HARDINGE  
Collet  
Index  
Clamps

Plans for Lathes and Millers

HARDINGE High Speed Mill  
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ELMIRA, N.Y.

GENERAL BULLETIN

*Routing*  
HARDINGE

PRECISION PRODUCTS

A request on your company  
letterhead will bring you a copy of  
this 16 page bulletin summarizing  
the profit making possibilities  
of each precision product.

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR

HARDINGE  
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Consolidated Vultee plans to take the job to the blind.

#### Classification of Workers General

- A. Indicates worker capable of heavy sustained labor.
- B. Indicates worker capable of moderately heavy labor.
- C. Indicates worker capable of light labor.
- D. Indicates worker capable of very light labor.

#### Modification

1. Worker with monocular vision or severe visual defect.
2. Worker with severe defect of hearing.
3. Worker capable of little walking.
4. Worker capable of sitting job only.
5. Worker with poor coordination.
6. Worker with nervous instability.
7. Worker with sensitive skin.
8. Worker with one arm. (Amputation.)
9. Worker with hernia.
10. Worker with tendency toward developing hernia. (Relaxed rings, large abdominal scars.)
11. Worker with history of back strain or injury.
12. Worker with chronic illness. (Cardiac lesions, nephritis.)
13. Worker with aphasic characteristics. (Senile.)
14. Worker with arrested T.B.C., asthma, chronic bronchitis.
15. Worker unsuitable for climbing, working around dangerous machinery. (By reason of age, weight, or other factors—diabetes, epilepsy, hypertension, leg defects.)
16. Worker with partial limitation of one hand.

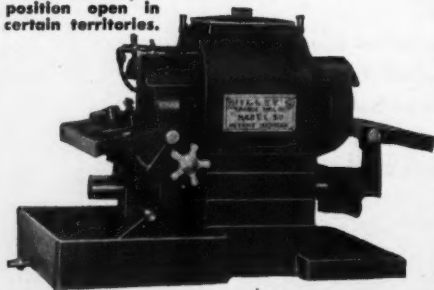
Since the first of the year, nearly 700 physically limited employees have been taking their places on the assembly lines, doing regular production jobs.

Do these workers measure up to

## WILLEY'S NEW BENCH TYPE GRINDER

#### DEALERS

An attractive proposition open in certain territories.



The new Model 50 is compact, designed for rapid, economical wet or dry grinding of tungsten carbide tipped tools as well as other types of tool bits ranging up to a maximum of 1 1/4" square or equal cross sectional area.

A precision grinder built for accurate work, capable of real production. Available with pedestal base if desired.

#### WRITE FOR FOLDER

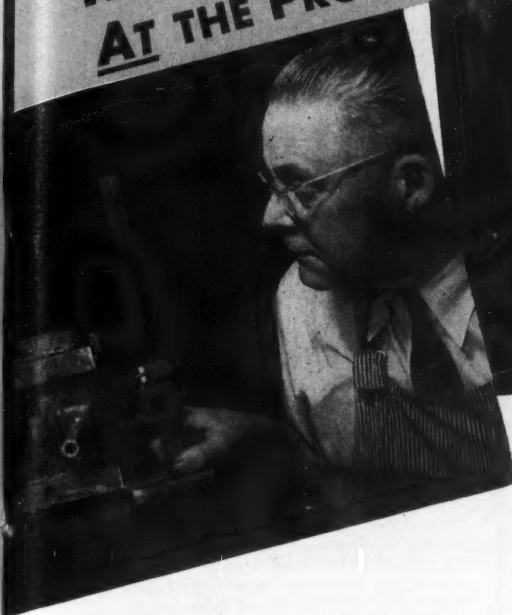
Contains complete specifications of Model 50 and other models.

## WILLEY'S CARBIDE TOOL CO.

1340 W. Vernor Highway

Detroit, Michigan

# KEEP VERNIER TOOLS AT THE PRODUCTION FRONT



—Safeguard these Tools  
for the production demands  
of your Country — it may  
take months to replace  
them these days.

To get the most from your Vernier Tools  
and to protect them against injury, ob-  
serve the following simple suggestions:

**HANDLE** Vernier Tools, particularly large tools, with  
extreme care.

Before moving the sliding member of a Vernier, **WIPE  
THE BAR** thoroughly. Dirt carried by the slide can  
damage graduations and interfere with the operation of  
the tool.

**WHENEVER REPLACING** sliding member on the bar,  
be sure that the gibs are not reversed from their original  
positions.

**GUARD** against the effects of heat on the accuracy of  
Vernier Tools. Hold in the hands as little as possible and  
do not place them near steam pipes, in sunshine or by  
other heat sources.

**DO NOT TOSS** Vernier Tools loosely into a drawer or  
drop them, as sudden shock can cause unsuspected dam-  
age and misalignment. Keep them covered for protec-  
tion when not in use.

Remember that every Vernier  
kept in useful service helps to  
make a new one available where  
it may be needed urgently for  
our united war effort.



Reproductions of this advertisement for use on your bulletin board furnished on request.

# BROWN & SHARPE TOOLS

# BURKE MILLING MACHINES



**No. 4 Motor Driven MILLING MACHINE**  
Mounted on Cabinet Column

Burke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

Write for complete information.

**BURKE MACHINE TOOL CO.**

297 E. 16th St.

Conneaut, Ohio

the promise held for them by the company? All foremen of departments where they are employed report in enthusiastic terms that their attendance record, for one thing, is better than that of normal workers. There is little absenteeism among the men and women reclaimed from the limbo of inactivity to which fate had seemingly exiled them.

Moreover, one foreman declared, "We find that 96.4 per cent of our physically limited employees are doing as well as normal persons; a lot of them are doing better. They're all serious about their work. They feel their responsibility to their nation and to their job. For most, this is a new opportunity in life, bringing them back from the shelf to an active and wonderfully useful existence."

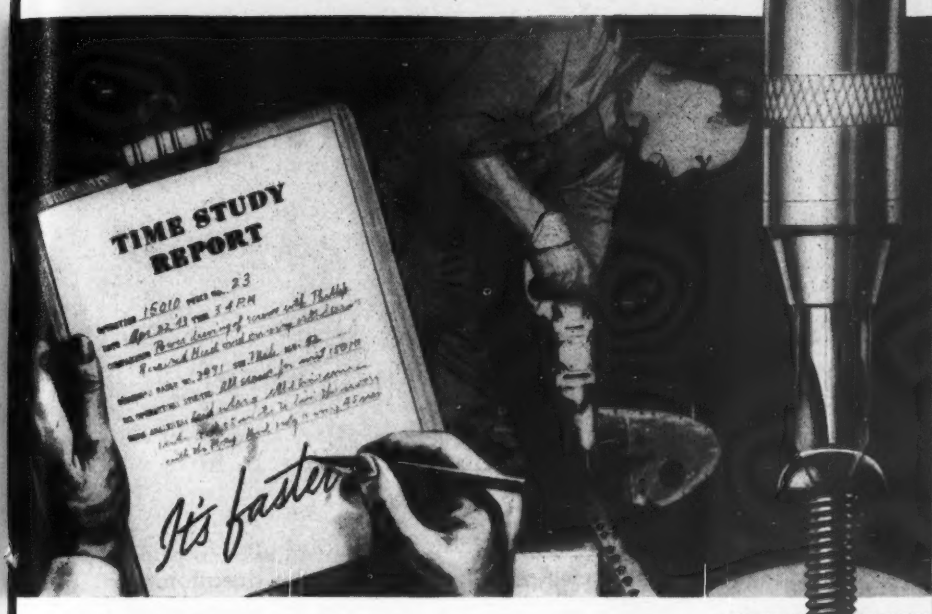
## Berliner Substitute and Alternate Service

J. J. Berliner & Staff, 225 5th Ave., New York, N. Y., announces a service aimed at solving the perplexing problem faced by American industries of obtaining suitable substitutes and alternates for critical materials.

A staff of technical research experts has completed the task of compiling and cataloging substitutes or alternates obtainable today for practically every item classified as scarce or likely to be short soon. The information was gathered and digested from every conceivable source, including private and governmental experimental stations from all accessible countries throughout the world. Substitutes are offered for such scarce or soon-to-be-scarce materials as lubricants, pigments, paints, varnishes, lacquers, rubber, plastics and allied products, cellulose, paper, leathers, metallurgical materials, mineral materials, fuels, ceramics, petroleum, and so on.

The Berliner information is issued on loose leaves in a system of continuous monthly supplementary reports so that one who subscribes may keep pace with the swift and revolutionary technological changes occurring under the impact of war. Subscribers seeking highly specialized information not included in the regular service are offered individual consulting privileges without charge.

# Arm Your Screw Driving Army for SPEED TACTICS



## SPEED-UP WITH PHILLIPS SCREWS!

Give your assembly line Phillips Recessed Head Screws and you'll give them the ammunition to clean up lagging assembly jobs on the double-quick!

In most cases, change-overs to Phillips Screws have cut driving time in half! All of the screw driving troubles that slow-up work are eliminated by the Phillips Recessed Head. The scientific recess, by automatically centering the driving force, prevents fumbling, wobbly starts . . . prevents slant-driven screws . . . burred and

broken screw heads . . . dangerous screw driver skids.

The Phillips Recess lends "old-hand" skill to the newest newcomer . . . makes fast, faultless driving automatic. It permits power or spiral driving on almost any job.

*They cost less to use!* Compare the cost of driving Phillips with that of slotted head screws. You'll realize that the price of screws is a minor item in your total fastening expense . . . that it actually costs less to have the many advantages of the Phillips Recess!

## KEY TO FASTENING SPEED AND ECONOMY

The Phillips Recessed Head was scientifically engineered to afford:

**Best Starting**—Driver point automatically centers in the recess . . . for straight, screw and driver "become one unit." Fumbling, wobbly starts are eliminated.

**Master Driving**—Spiral and power driving are made practical. Driver won't slip out of recess to injure workers or spoil material. (Average time saving is 50%.)

**Smaller Driving**—Turning power is fully utilized by automatic centering of driver in screw head. Workmen maintain speed without tiring.

**Better Fastenings**—Screws are set-up uniformly tight, without burring or breaking heads. A stronger, faster job results.



# PHILLIPS *Recessed Head* SCREWS

WOOD SCREWS • MACHINE SCREWS • SELF-TAPPING SCREWS • STOVE BOLTS

**21 SOURCES**

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The Bristol Co., Watertown, Conn.  
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Chandler Brothers Corp., Cleveland, Ohio  
Continental Screw Co., New Bedford, Mass.  
The Corbin Screw Corp., New Britain, Conn.  
The H. M. Harper Co., Chicago, Ill.

International Screw Co., Detroit, Mich.  
The Lomon & Sessions Co., Cleveland, O.  
The National Screw & Mfg. Co., Cleveland, O.  
New England Screw Co., Keene, N. H.  
The Charles Parker Co., Meriden, Conn.  
Porter-Kelam Corp., New York, N. Y.  
Purdue Screw Co., Portland, R. I.

Phall Manufacturing Co., Chicago, Ill.  
Reading Screw Co., Norristown, Pa.  
Russell Brothers & Ward Bldg. & Hot Co., Port Chester, N. Y.  
Sawill Manufacturing Co., Waterville, Conn.  
Sheltonproof Inc., Chicago, Ill.  
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# *Yes* **WE DELIVER ON TIME**

● No holding up vital jobs while you wait for your grinding wheels or mounted wheels.\*

Timing and scheduling are everything now. That's why our streamlined QUICK SERVICE is such an important asset.

Fully approved and endorsed by W P B, here's our wartime speed setup:

- Manufacture only wheels 3" in diameter and under. To speed production, larger sizes are eliminated for the duration.
- No quitting whistle. We are on the job making wheels 24 hours a day, every day.



\*Half a century of specialization has established our reputation as the Small Wheel People of the Abrasive Industry. You can bank on us.

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## **TRY ONE**

Tell us the kind of equipment, the job, and size wheel you want to try. We'll send it postpaid.



The wheels of proved quality — known for performance, cutting and long life.



Any shape, grain and grade, any size up to 3" in diameter. From this army of wheels you can select one custom built for your job.

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"—absenteeism, which has always been present in industry, is serious now because of war labor shortages. Unexpected vacancies on the production line cannot be filled fast enough to maintain output schedules."

## Practical Methods of Dealing with Absenteeism

**E**QUALITY of sacrifice does not exist in this war. The men and women who man our machines, the executives who run our mighty industries, the housewife who keeps her home together all face trying war-time difficulties. But their lot can never be compared to that of the soldiers fighting and dying in the jun-

gle and on the desert, and the men clinging to a tiny raft in vast stretches of ocean or holding out by a damaged plane in a bleak cold wilderness of snow.

The standard of performance for victory on fighting and production fronts is not equality of sacrifice but maximum efficiency.

Haskins Flexible Shaft Machines Do a Great Job of

# SAVING MONEY

on Grinding, Sanding, Polishing, Rotary Filing  
and Wire Brushing Operations

*Finishing Operations cost less per man and machine hour on HASKINS Flexible Shaft Equipment.* Your men work faster with these easy handling machines. Maintenance costs are less. Machine life is longer—more trouble-free. 30 different Haskins units provide a specially engineered machine for every kind of work. Write for Catalog 45. Shows many ways to speed production with flexible shaft equipment. R. G. Haskins Company, 619 South California Avenue, Chicago.

#### *Let Flexible Shaft Equipment Save—and Make—You Money*

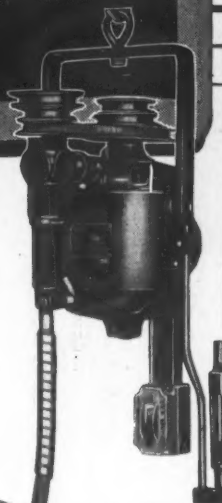
In every machine shop, foundry and die shop, there's no end of jobs that Haskins Equipment can't do better, faster—and longer. For these are no single operation machines. Regardless of the range of work, there's a Haskins unit with the right power, the right mounting and the right drive (direct or multi-speed countershaft) to meet your requirements.

European Representative: G. E. Marbaix, Ltd.,  
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**HASKINS**  
*Flexible Shaft*  
**EQUIPMENT**

More VERSATILE Machines for  
More PROFITABLE Work



**Type CH-4**  
1/2 H.P. multi-speed  
unit (1180 to 7500  
RPM). Overhead  
mounting for fixed  
or trolley suspen-  
sion.

Take the case of a machine shop devoting all its resources to production for the armed forces. Management has appealed to the workers in this shop to match performance with the soldiers who fight in foxholes, where the enemy has no regard for days off or time out to rest. In push-

industrial accidents are among the major causes of absenteeism—a production problem which has received its full share of publicity recently. You can't lick absenteeism by appeals for equality of sacrifice but only by attacking its basic causes.

This is the attitude of management

in more than 200 war plants reporting their experience in dealing with absenteeism to the Division of Labor Standards, U. S. Department of Labor. The story that they tell indicates the methods of control tried at the plant level, and the degree of success which might be attained if these methods were more generally used throughout the country. The firms include machine shops, shipyards, aircraft plants, electrical and chemical firms, precision instrument companies, utilities, textile mills, food concerns, and others engaged in war work and



"—their lot can never be compared to that of the soldiers fighting and dying in the jungle and on the desert—"

ing toward equality of sacrifice, these workers put in 7 days a week and speed up work to the limits of endurance. Their work adds up to an increase in overtime 26,200 hours, but during the same period illness and accidents in the shop cause a time loss of 23,800 hours. Thus the shop loses 80 per cent of the time increase.

Such attempts at equality of sacrifice will not win the war. Illness and

operating in every large industrial State.

These firms recognize that absenteeism, which has always been present in industry, is serious now because of war labor shortages. Unexpected vacancies on the production line cannot be filled fast enough to maintain output schedules. As our young men have entered the armed services, the demand for labor has

# ATKINS

## *Curled Chip* SAWS

Cutting with  
**SPEED and PRECISION**

Whether It's  
**ARMOR-PLATE**  
... Or Any Other  
Ferrous or Non-Ferrous  
Metal

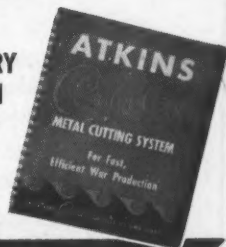
● Throughout industry, on cutting jobs that would quickly wear out ordinary saws, Atkins Curled-Chip Saws are setting extraordinary records for speed, cutting accuracy, and blade life. Armor-plate, aluminum, bronze, copper, steel, iron and just about every other material used in war production are being converted into finished war materials faster because the metal cutting operations take less time. Atkins file of performance data on the Curled-Chip System is "must" reading for every plant man. It is part of the Curled-Chip manual shown at the right. Write us for a copy.

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**Cutting a Name for Themselves in National High-Speed Production**

# ROGERS REAMERS

SINCE 1885



Fig. 37



Fig. 39

Conserve High Speed Steel by using  
Rogers Inserted Blade adjustable-for-  
wear Reamers.

Align and concentric in diameter down  
to  $\frac{1}{8}$  inch.

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brought into war plants many people who are unaccustomed to industrial life—women, older workers, youngsters, boys about to be drafted, and people physically below par. They are giving their best efforts to their jobs, but wartime working and living conditions are particularly difficult for them, and often reasons beyond their control make steady performance impossible. Absenteeism will undoubtedly become more serious in the months to come, as the employment of these groups increases.

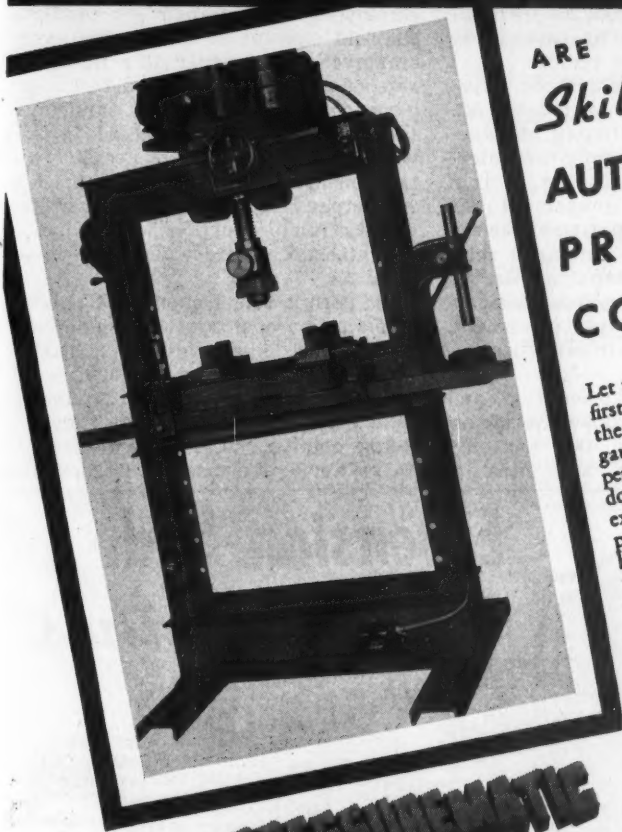
Consequently, these plants are trying to study the problem and control it as far as possible. They want to know the extent, departmental peaks, trends, and causes of their absenteeism, as a basis for control measures. Some of them with accounting and research facilities are keeping detailed records and analyses of extent and cause. The Division of Labor Standards of the Department of Labor will publish shortly sample forms in use by such companies. Other firms simply count unpunched time cards to learn the number of employees absent by plant, department, shift, day, and usually sex. The Bureau of Labor Statistics suggests this formula for determining absentee rates:

$$\text{Absenteeism} = \frac{\text{Man days lost}}{\text{Man days worked plus man days lost}}$$

In order to determine causes some plants make spot checks by interviewing returning absentees from time to time.

Good personnel management and supervision are basic in controlling absenteeism. The foreman—whether he is the “big boss” in a small shop or a first-line supervisor in a huge plant—can discover causes of absenteeism more easily than personnel or other officials because he is closest to the workers. He can report reasons for absence so that management can try to ameliorate or remove them.

# Even the Inexperienced



ARE  
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*Lemco's "E" is  
for outstanding  
war production.*

He can convince absentees of management's sincere interest in their problems and can show them how important their regular attendance is to the war effort. He can also supply the disciplinary word to the frequent offender who cannot fool his own supervisor as easily as he may those officials who are more remote.

But the best foreman, to be effective, must be backed by clear management policies, continuing management interest in reducing absenteeism, good personnel practices, and, in a big plant, what management has called "close coordination between medical departments, industrial relations, and operating departments."

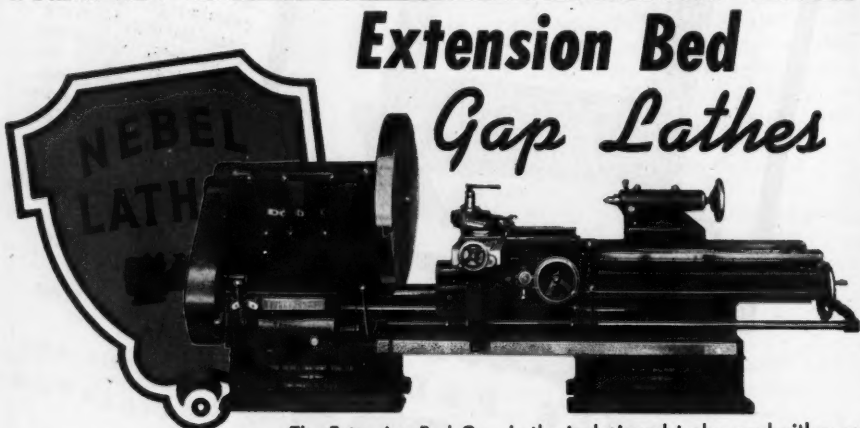
One of the first steps in a good personnel program is proper placement. A spokesman for an aircraft corporation says:

"Proper placement, promotion, and up-grading is the framework of industrial efficiency. . . . One has only to examine the inter- and intra-de-

partmental transfers, employee grievances, turnover figures, etc., to feel the undercurrents of employee discontent and ill will.

"Absenteeism is only one of many undesirable channels through which employees express their job conflicts. The old concept of classifying every employee as a learner at a minimum rate of pay without regard to his experience, training, interest, and aptitudes is ultimately reflected in bad work habits, indolence, excessive absenteeism, and eventual termination. A company must assume all responsibility for production losses due to absenteeism as a result of poor placement."

To permit replacement and prevent interruption of production, some companies post advance work schedules and pre-plan absences as far as possible. If workers know that work is laid out for them and that they are being counted on, they will hesitate to be avoidably absent. If they also



Illustrated is the Series "AG" 20/40" Extension Bed Gap Lathe. Also made in 28/50" Heavy Duty.

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know that the company has explicit and liberal rules with respect to excused absence, they will more willingly try to plan their absences in advance and notify their foreman.

Of the plants reporting their experience to the Division of Labor Standards of the Department of Labor, those with sound industrial relations usually had the lowest absentee rates. They report that shop stewards, union officials, and labor-management committees are invaluable in helping to reduce absenteeism if their cooperation is properly enlisted. For example, R. D. Stoup of the Standard Stoker Company, Inc., Erie, Pa., says:

"We have been successful in reducing our percentage of absenteeism from about 18 per cent per week one year ago to a low of 4.01 per cent in recent weeks. This splendid showing is entirely due to the cooperation we have received from the representatives of the American Federation of

Labor, Metal Trades Department. . . . Because of the complete cooperation of each member of the committee in urging the workers in his department to make every day a working day we have been able to bring our . . . figure so low that we feel our union representatives in the plant are entitled to very hearty congratulations. . . . It is my firm conviction that a committee of men representing the workers in any plant can be as successful when the matter is placed squarely before them and a sincere effort made to enlist their cooperation."

There are many factors related to the job and the individual to which these companies have given close attention in attempting to reduce absenteeism. For instance, what daily and weekly hours will maintain maximum production over a long war period? Present hours schedules may be an added strain for workers already handicapped by home responsibilities or physical disabilities. The

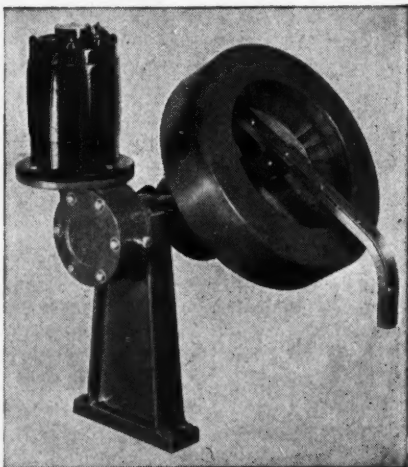
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For Electric Tools, call your Stanley distributor and save time, save work. Stanley Electric Tool Division, The Stanley Works, New Britain, Connecticut.

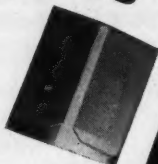


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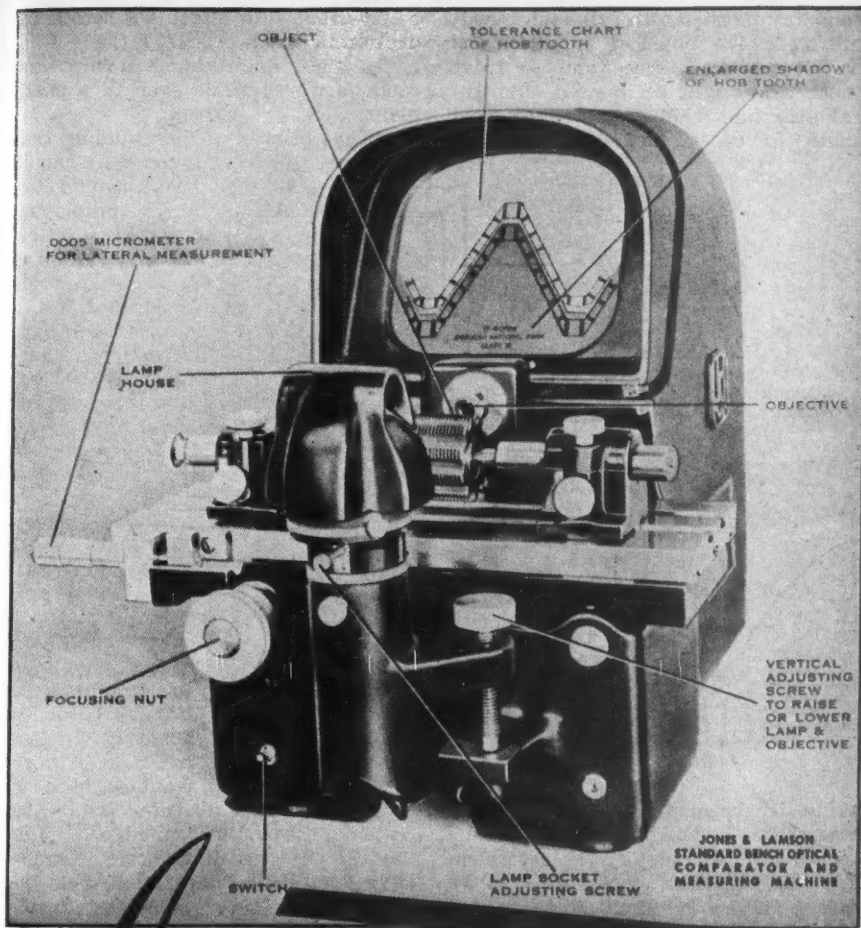
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problem will demand more attention as the employment of such workers increases. It may be necessary to adjust such hours to meet their needs if their services are to be available to war production. The Aircraft War Production Council on the West Coast is considering arrangement of the workweek to permit one and one-half days off per week so that workers can attend to personal affairs; and part-time shifts for workers who cannot take full-time jobs in industry.

Directly related to long hours is the problem of industrial accidents—an important cause of absenteeism. Such casualties are on the increase not only because of long hours but also because of wartime demand for speed, employment of inexperienced workers, maintenance problems growing out of round-the-clock production, overcrowded workshops, use of new chemicals and new processes. Accidents are preventable, as the record of the U. S. Department of Labor's National Committee for the Conservation of Manpower in War Industries shows. More than two-thirds of the 10,000 war plants serviced by this Committee last year markedly reduced accident frequency as well as severity.

Long hours are undoubtedly one cause of ordinary illness—the major source of absenteeism. Revere Copper and Brass in a 6 weeks' survey of absenteeism in all its plants found that personal sickness was the greatest single cause, accounting for 48.4 per cent. How much illness is due to community infections and how much to industrial fatigue and poor working conditions is impossible to determine. Many plants are attacking illness through their medical and first aid departments primarily set up to control industrial accidents and disease. Kenneth R. Field describes the health program operating at the Portland, Oregon, terminal of Consolidated Freightways:

"We made arrangements with our



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For inspection and measurement in the toolroom or for comparison inspection of production parts with a master chart or template, the economy of inspection by Optical Projection with Jones & Lamson Comparators is beyond question. Errors are immediately detected, thus they can readily be corrected, and the loss of much valuable time eliminated.

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MACHINE TOOLS**

company physician to call each morning and give physical examinations on all new employees and to treat those who might be in need of medical attention. Our nurse gives cold shots to those employees desiring

policy went into effect we had a reduction in absenteeism." Mr. Field believes that maintaining a first aid room is worth while even in a small plant:

"It has been my understanding that a company should have around 600 or 700 employees to make practical the installation of a first-aid room supervised by a nurse. We have only 400 employees at our Portland terminal and have found our first-aid room to be very profitable."

Medical departments in some plants have attacked illness with efforts to improve workers' food habits through educational publicity. Plant after plant ranks dietary troubles high on



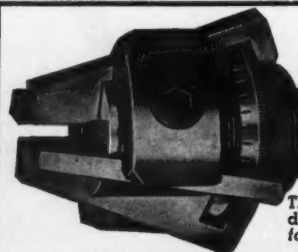
"In the afternoon—the nurse calls on those employees who we feel might not be as ill as we are led to believe."

same, treats minor ailments and advises those needing medical attention to see a physician. In the afternoon she calls on those employees who we feel might not be as ill as we are led to believe. Immediately after this

their illness and absentee lists. The National Research Council has found that 71 per cent of workers' families have "poor" or "only fair" diets. A "Food for Victory" club was started in one of the Westinghouse plants,

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The Dumore Company, Grinder Division, Racine, Wisconsin.

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PRECISION  
GRINDERS

The Heart of the Grinder  
is the Quill!



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and the idea spread to many of the company's other plants and even to other companies. Educational materials on nutrition can now be purchased from Westinghouse for use in these clubs.

With longer working hours and the employment of new workers, including women with home responsibilities, with food shortages, and point rationing, absenteeism is increasingly caused by difficulties of shopping, banking, visits to dentists, doctors, rationing and draft boards, barbers and beauty shops. Many plants have arranged with stores to remain open during leisure hours of workers on various shift, and to hold back some food for sale when the workers begin to shop. Arrangements with rationing boards have been made to assist workers in securing ration books in as efficient a way as possible.

There are many other causes of absenteeism, and management is experi-

menting with many other ways of eliminating them. The U. S. Department of Labor has summarized the practical experience of more than 200 plants in this field in **Controlling Absenteeism, A Record of War Plant Experience**, just published by the Division of Labor Standards, U. S. Department of Labor.

**"Spec-Dee" Printer**, a machine for quickly and accurately producing blue-prints and black-and-white prints, is covered in a six-page folder released by the manufacturer—Peck and Harvey, 4327 Addison St., Chicago, Ill. Copy free upon request.

**Ace Drills.** A 20-page bulletin containing complete information on the line of ground-from-the-solid drills marketed by the Ace Drills Co., 13835 Jennings St., Detroit, Mich., is now being distributed by this firm. Among the various types of drills treated are jobbers, wire, letter, taper length, and automotive standard drills. Copy of bulletin free.

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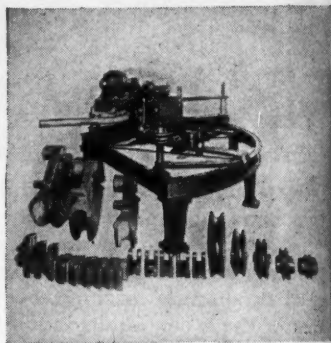
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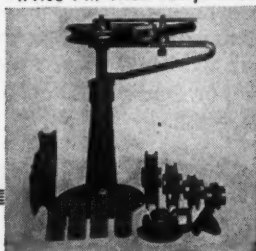
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steel for  
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For the new type of tools, the new  
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steels, cast iron and other tough assignments  
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**Bry**

August



**W**ith that curtly classic reminder, one of America's most famous research engineers replied to a man in the act of rhapsodizing about the wonderful ingenuity of man.

For the barnacle, he pointed out, is a symbol of all those things that have *not* been done—a tiny marine organism that costs us millions every year — simple, "impossible" things that are still to be accomplished.

Under the secrecy of forced-draught war research, many incredible accomplishments—seemingly impossible within our time—have already occurred. For obvious reasons, these may not be discussed, but of one thing we can be certain: The end of this war will inaugurate the greatest era of industrial sur-

prises since the age of machinery began.

We at Bryant have developed many new techniques during the past few months. Our engineers are working on hundreds of production lines today, helping to solve production problems involving the machining of hard rubber, plastics, glass, graphite, cast iron and bronze, as well as forged, centrifugally cast and surface-hardened steels, light metals and alloys from a hundred new specifications.

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Call upon us now!

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SPRINGFIELD, VERMONT, U. S. A.



SEND FOR THE MAN FROM BRYANT

# Tooling <sup>for</sup> the Automatic Screw Machine, VI

By NOEL BRINDLE

## *Threading and Tapping Operations—Tools and Methods— Keeping Tap Breakage at the Minimum*

**F**OR performing internal and external threading operations on the automatic screw machine several different types of tap and die holders are used, each of which offers a definite advantage for a particular operation. In this article the author presents a study of two typical screw machine products for the processing of which some of the more commonly used thread-cutting tools are required.

External threading operations are usually performed by using a button die holder, a threading die holder with an adjusting cap, or a self-opening die holder. Internal threads are produced in a similar manner, by using a tap. The first two die holders mentioned and the tap holder are available in two styles, releasing and non-releasing. The releasing holder is generally used in hand screw machines; the non-releasing holders are more suitable for use in automatic screw machines. The front part of the non-releasing holder carries the die or tap and can be moved forward and backward but cannot be rotated.

When the number of seconds required to make a given part in an automatic screw machine is large; i.e., 60 and over, in designing the cams it may be found that the threading lobe will be too thin for practical

use. To meet this condition a dwell of approximately 1/100 of cam surface is provided and the threading lobe is widened accordingly. When this construction is used, a releasing-type threading or tapping holder is used and the front part of the holder releases and rotates with the spindle while the lead cam roller is in contact with the dwell on the top of the lobe. As the reversing mechanism functions, the front part of the holder reengages the stationary body of the tool and the die or tap withdraws from the work.

A part for the machining of which two threading tools will be required is illustrated in Fig. 25. The large-diameter thread is cut with a self-opening die, a button die or threading die held in a holder with an adjusting cap being used for the small thread. The self-opening die is a highly practical tool for most general external threading; however, when a small-size thread is required to be cut close to a shoulder it is advisable to use a button or similar die.

The die used in the adjusting cap type of holder is frequently referred to as a button die because it provides ample clearance for the chips and is quite easy to sharpen. Moreover, the dies used in such holders are available



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Lima's simplified design, sturdy construction assures fast, smooth, accurate operations hour after hour, day after day, with less maintenance attention and with less operator fatigue.

Lima's are safe ... it is not necessary for the operator to touch the belt at any time in changing or making new machine set-ups.

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162 FINDLAY ROAD

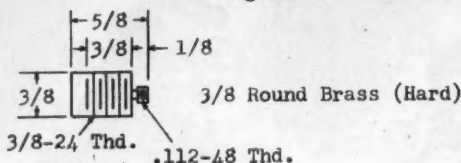
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Fig. 25



|                              |  |              |               |                         |
|------------------------------|--|--------------|---------------|-------------------------|
|                              | B&S #00G H.S. 36 Sp. A.S.M.<br>6000 R.P.M. Backward<br>2000 R.P.M. Forward<br>3 Sec. |              |               |                         |
| <b>Order of Operations</b>   | <b>Throws</b>  | <b>Feeds</b> | <b>Revs.</b>  | <b>Hun-<br/>dredths</b> |
| Feed to Stop                 |  |              | 30            |                         |
| Cut Off and Form dw.         | .096   | .0035        | 28            |                         |
| Clear and Rev. Spin.         | .136   | .002         | 72            | 12                      |
| Thread on (.112-48) Acorn    |  |              |               |                         |
| Die Holder                   |  |              | 27            |                         |
| Reverse Spindle              |  |              | —             |                         |
| Thread Off                   |  |              | 9             |                         |
| I.T. and Reverse Spindle     |  |              | 30            |                         |
| Thread (%-24) Self-Opening   |  |              |               |                         |
| Die Holder                   |  |              | 39            |                         |
| I.T. and Reverse Spindle     |  |              | 30            |                         |
|                              |  |              | 265 = 88/100  |                         |
|                              |  |              | 301 = 100/100 |                         |
| <b>Operations Overlapped</b> |  |              |               |                         |
| Chamfer dw.                  | .015   | .002         | 12            |                         |

in high speed steels. Another factor of importance is the large number of parts that can be threaded before the die required resharpening.

The part presented in Fig. 25 is made from free machining brass rod. A Brown & Sharpe No. 00G High Speed 36-speed machine with a maximum spindle speed of 6,000 r.p.m. has been selected for purposes of illustration.

It will be necessary to use two spindle speeds for the machining of this part; a slow speed to thread the die onto the work, and another speed, in the opposite direction, to thread the die off the work. On page 273 of the B & S Treatise the 6,000 r.p.m. speed

will be found grouped with 2,000 r.p.m. and 1,200 r.p.m. spindle speeds. This arrangement provides for a combination of 6,000 and 2,000 r.p.m. or 6,000 and 1,200 r.p.m. The 2,000 r.p.m. is used for general threading, and will be selected in this case. However, the 1,200 r.p.m. is available when a coarse thread is to be cut. The "thread off" operation is performed at a speed of 6,000 r.p.m., as indicated in Fig. 25.

The cutting-off and chamfering operations are advantageously performed at the high spindle speed. For the machining of a similar part upon

which turning and drilling operations would be required, left hand turning tools and drills would be employed, in order to take full advantage of the backward rotation of the spindle at high speed.

The chuck sketch, Fig. 25, shows the cut-off tool forming the small thread diameter, thereby eliminating a turning operation. The recess for the thread is also machined with the cutting-off tool.

The sequence steps show that both the threading operations are performed before the stock is fed out to the stop. This arrangement enables the threading operations to be performed close to the chuck. Clearance time



## DON'T LET A WORN BEARING SABOTAGE THE WHOLE TOOL

### Subjects Discussed in "Keep 'em Working"

How Often Should Tools Be Inspected?  
What To Do When Tools Are Inspected.  
Correct Amounts of Grease To Use.  
Ball Bearings—Replacement and Care.  
Switches—How To Prolong Their Life.  
Care and Repair of Cable.  
Causes of Stator Troubles and Overheating of Tools.  
How To Order Spare Parts.  
Selection of Frequency Changers.  
"Shorts", "Grounds", Single-Phasing.  
Fusing For Peak Output.  
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If bearings of HIGH-CYCLE tools are not replaced when worn, the working parts of the motor rub, causing expensive repairs, interrupting production and perhaps permanently reducing the power of the tool.

Since they're comparatively cheap, they should be replaced when they show appreciable wear. Here, the old adage certainly applies, "A stitch in time saves nine".

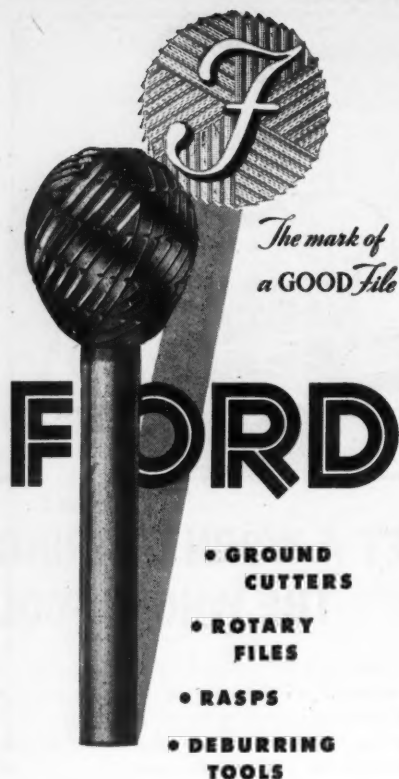
How do you tell when a bearing is worn dangerously? This is discussed on Page 5 of the Rotor Maintenance Manual, "Keep 'em Working". This guide gives pointers on all aspects of HIGH-CYCLE tool care. Concisely written and easy to understand. A condensed version also is available in a wall chart for handy reference in the shop. These . . . or similar, on AIR tools . . . are yours for the asking.

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has been provided in the order of operations to allow the cutting off tool to withdraw from the work before the die holder with the adjusting cap is brought into cutting position.

The throw required to cut off the part will equal the "approach," plus half the stock diameter, plus the depth of the angle on the cut-off tool, plus 0.005 inch for the heel of the cut-off tool to pass the center line of the spindle. The cut-off tool also performs a forming operation; therefore it will be desirable to use two "feeds per revolution." The slower feed will begin when the forming of the thread diameter takes place.

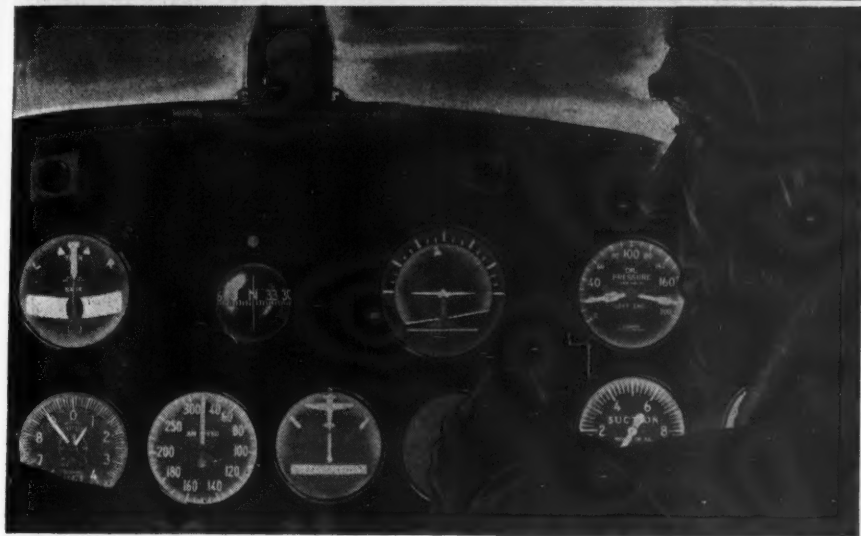
The number of revolutions required to thread the 0.112-48 diameter are figured as follows: The actual number of threads in the  $\frac{1}{8}$ -inch length are computed, and 3 extra threads are added to allow for approaching the work. This figure will equal the number of revolutions required for threading off the work at the fast speed. For threading onto the work, the above figure will be multiplied by the ratio between 6,000 and 2,000 r.p.m., which is 3 to 1.

The number of threading revolutions required for the  $\frac{3}{8}$ -24 thread is figured in a similar manner, with the exception that 4 revolutions are added for approaching the work. The figure thus obtained is multiplied by the same 3 to 1 ratio. When using a self-opening die holder, it is not necessary to allow time for threading the die off from the work.

The number of revolutions required to index the turret and feed the stock are taken from page 273 of the B & S Treatise. Looking in the 6,000 r.p.m. column, it will be found that 25 revolutions is correct, with a few extra revolutions added for set-up convenience.

An allowance of 6/100 of cam surface is usually considered ample for the clearance time required between the cut-off tool and the die holder.

## What sharp eyes they have



Even on moonless nights and in pea-soup weather our pilots can "see" their way to the enemy target, and back home again—thanks to the precision instruments with which their planes are equipped. Little wonder then that protecting the low-tension wires, the optic nerves upon which those all-weather eyes depend, is such an important task—and one that is often entrusted to American Flexible Metal Shielded Conduit.

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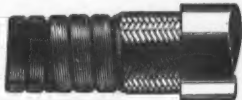
Protecting low-tension wires on delicate aircraft instruments is only one of the important jobs assigned to products of American Metal Hose. In industry,

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American Flexible Metal Shielded Conduit for the protection of low tension wires on aircraft instruments. Available either with fittings attached or in coils with fittings loose.



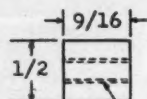
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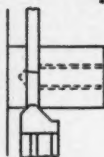
*In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario*

Fig. 26



1/2 Round Steel (X1112)

.190-32 Tap



B&amp;S #0G Regular A.S.M.

| Operations | A       | B    | C    | D   |
|------------|---------|------|------|-----|
| Drill      | 100     | 2400 | 1800 | 77  |
| Tap        | 40      | 790  | 820  | 41  |
| Cut Off    | 225     | 1748 | 1800 | 236 |
|            | 17 Sec. |      |      |     |

| Order of Operations              | Throws                        | Feeds | Revolutions |
|----------------------------------|-------------------------------|-------|-------------|
| Feed to Stop                     |                               |       | 24          |
| I.T.                             |                               |       | 24          |
| Cent. dw.                        | .070                          | .004  | 22          |
| I.T.                             |                               |       | 24          |
| Drill (.166 dr.)                 | .667                          | .004  | 187         |
| I.T. and change speed            |                               |       | 24          |
| Tap in                           |                               |       | 46          |
| Reverse Spindle                  |                               |       | —           |
| Tap out                          |                               |       | 46          |
| Reverse Spindle and change speed |                               |       | 14          |
| Cut Off                          | .230                          | .002  | 115         |
|                                  |                               |       | 506         |
|                                  | Nearest available revs. = 510 |       |             |
| Operations Overlapped            |                               |       |             |
| Chamfer dw.                      | .015                          | .002  | 12          |

However, reference to page 273 of the B & S Treatise shows that, when the preliminary total number of revolutions are added, only about 3 seconds will be required to make this part. When a part can be made on the No. 00G machine in approximately 3 seconds it is recommended that (page 253 of the Treatise) the clearance time usually provided should be doubled. Accordingly, 12/100 are shown in Fig. 25.

The 265 revolutions indicated in Fig. 25 equal 100/100 of cam surface minus the 12/100 allowed for clearance. Multiplying 265 by 100 and dividing by 88/100 equals 301 total revolutions. On page 273 of the Treatise

it is shown that 300 revolutions are required to make the part in 3 seconds.

The drawing in Fig. 26 presents a part with a tapped hole through it. Incidentally, it seems to be the consensus among screw machine operators that tapping probably gives more trouble than any other cutting operations performed in the automatic screw machine. Some of the difficulties are discussed in a set of questions and answers at the end of this article.

The style of machine that should be used to make the part shown in Fig. 26 is a Brown & Sharpe "Regular"

Automatic Screw Machine with a reversible spindle. Steel parts should be made in the "regular" type machine whenever possible, leaving the high-speed machines for the production of brass and aluminum parts. A No. 0G Automatic Screw Machine has the required capacity for making this part, as shown on page 256 of the B & S Treatise.

The spindle speeds necessary for the machining of SAE X1112 steel are determined by using the following method. In Fig. 26, column "A" lists the recommended surface speeds for cutting operations, and in column "B" the spindle speeds required to obtain the surface speeds in the previous

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**HANNIFIN** *pressure regulating* **VALVES**

column are listed. In column "C" are listed the spindle speeds available on the No. 0G machine as they are given on page 233 of the Treatise. This combination compares with the 1,748 and 790 r.p.m. shown in column "B." In the last column the available surface speeds are entered, based on the actual spindle speeds to be used.

A chuck sketch should be made, followed by an arrangement of the order of operations. For the production of the part shown in the drawing each cutting operation is logically followed by the succeeding one, and the part would not readily be made in any other manner.

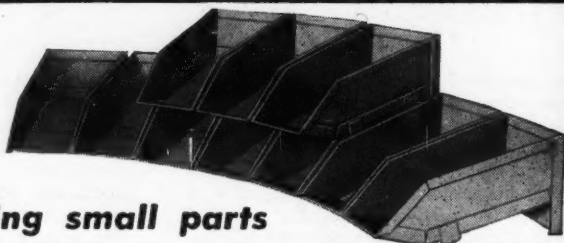
The design of the old style "regular" machine includes a mechanism for changing the speed of the shaft on which the driving pulleys are located. This feature, used in conjunction with the reversing mechanism, allows the spindle to be driven at fast or slow speed in either forward or

backward direction. When this arrangement is used, the tap enters the work at the slow speed and is withdrawn at the same slow speed. This will explain the item "Reverse spindle and change speed" in Fig. 26.

The throws for centering, drilling, chamfering, and cutting off the part are figured, and the correct feeds per revolution are chosen, then the number of feeds is divided into the number of throws to obtain the number of cutting revolutions that will be obtained. The figure for the feeds per revolution is approximately 25 per cent higher than the figure shown in the B & S Treatise for mild steel. The free-cutting qualities of SAE 1112 steel permit this increase.

The number of revolutions for the idle time, such as feeding stock, indexing the turret, and changing the speed, will be found by referring to page 256 of the Treatise. The  $\frac{3}{4}$  of a second for feeding and indexing and

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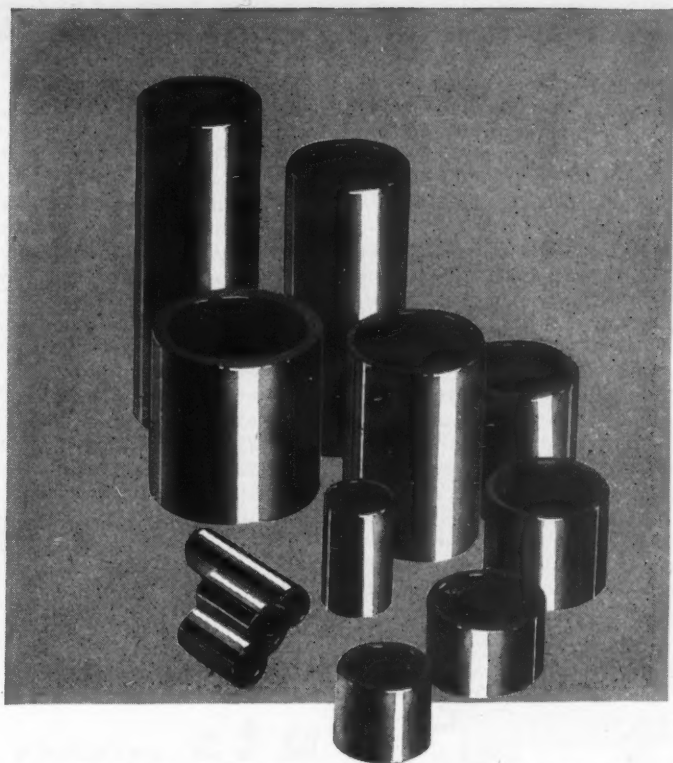
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the  $\frac{1}{3}$  of a second required for changing the speed can be converted to revolutions by referring to page 278 of the Treatise. The  $\frac{1}{3}$  second equals 20 revolutions, and a few more revolutions are added to facilitate setting up the machine. For changing the speed the  $\frac{1}{3}$  second will equal 10 revolutions, to which are added a few extra, as mentioned above.

The number of revolutions to be allowed for threading the tap in and out of the workpiece is figured in the following manner: First, the number of threads to be cut is determined. In the case under discussion, 18 will be required. Three extra threads are added to allow the tap to approach the work. The number of threads required also equals the number of revolutions of the spindle. All the figures for revolutions shown in the column are based on the fast speed; therefore the 21 revolutions required to thread the tap into the work at the slow speed will change by the ratio

of 820 r.p.m. and 1,800 r.p.m. applied to 21, resulting in the 46 revolutions given in the column.

The cutting tools for this job are made from high speed steel, and will include a centering tool, a twist drill, and a tap. The centering tool and the drill are held in B & S floating holders, and a B & S No. 20 tap holder will be used for the tapping operation. This holder is of the non-releasing type usually used in the automatic screw machine.

The figure for the number of revolutions is added, and the total of 505 is compared with the nearest number of revolutions available on the machine at a given time in seconds. On page 278 of the Treatise, under the 1,800 r.p.m., the nearest speed available is 510 total revolutions, and the column at the right shows that 17 seconds will be required to make the part.

Where tapping operations are included in the production of small



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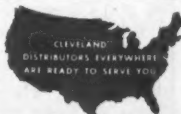
Distributor's business to know what materials you must have to keep your operations on schedule. He orders ahead for you and all his other customers. He buys on priority—he buys as much as he can—he buys as often as he can.

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- V** Motor type to suit your requirements.
- V** Capacities: Machine screw to 1½" hand taps—2 to 10 flutes, right or left hand with interchangeable heads.
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work on the automatic screw machine, unless a great deal of care is taken in following certain rules that have been dictated by experience an excess of broken taps may result. Some of these rules are given here:

1. When tapping through a work-piece, the width of the cut-off tool should equal three times the pitch of the tapped hole.

2. The tap drill should be of the correct size, so that the tap will not be required to remove more material than is necessary.

3. When the depth of tapping is more than three times the diameter of the tap, both roughing and finishing taps should be used.

4. The surface speed should be suitable for the material that is to be tapped.

5. The style of tap used should be correct for the material to be tapped. Taps of the two-flute variety are not entirely suitable for the automatic screw machine because insufficient chip clearance is allowed, but taps with three or four flutes, to manufacturers' standard, are acceptable. For tapping steel, aluminum, and tough materials, a spiral-fluted tap is preferred, as the spiral flute facilitates discharging the chips.

6. When tapping into a blind hole, the hole should be drilled to a depth equal to the depth of tapping plus three times the pitch of the thread.

---

**Cromoco Air-Hardening Die Steel** for high production is the subject of a four-page illustrated folder announced by the Firth-Sterling Steel Co., McKeesport, Pa. Copy free upon request.

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**Training Film Circular.** A four-color circular containing complete descriptions of two apprentice training films, "The Metal Working Lathe" and "Plain Turning," together with detailed information on how they can be obtained is now being distributed by the South Bend Lathe Works, South Bend, Ind. Copy of Circular No. 8-A free upon request.



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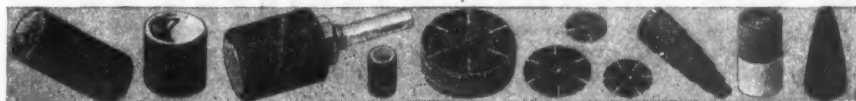
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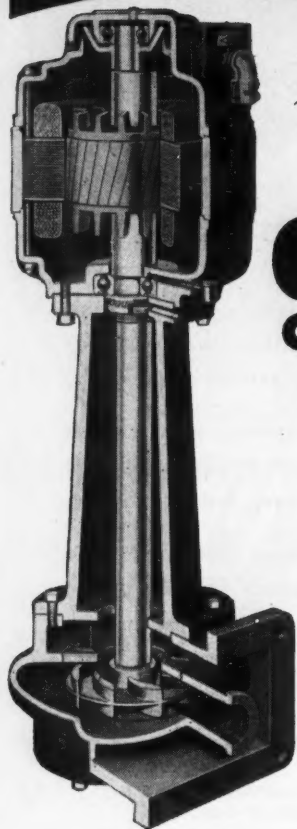
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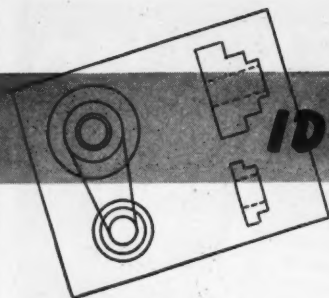
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## IDEAS FROM READERS

### A One-Man Stock Reel

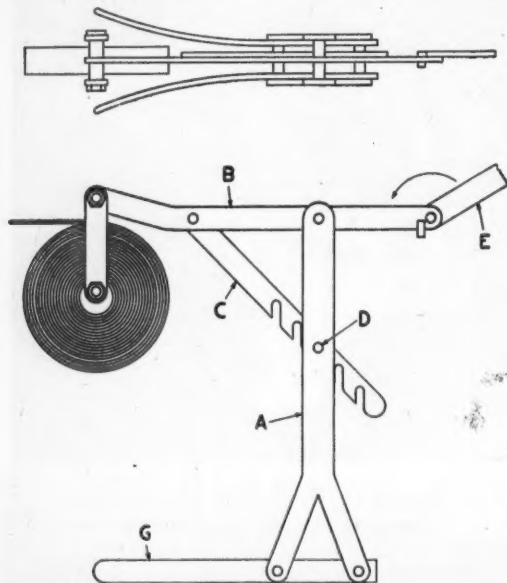
By CHAS. H. WILLEY

**P**RESENTED in the drawing herewith is the design of a reel that can be adapted to handle any type or size of coil stock, and which can be manipulated by the press operator alone, thus saving on labor and speeding the handling of stock at the press.

The two pieces that form the up-rights, A, are made from  $\frac{3}{4}$  x 3-inch

steel, and the other flat sections are of  $\frac{3}{4}$  x 2-inch steel. The coil of stock is suspended from a spool at one end of a cross-bar, B, which is pivoted to the uprights. The bar C is notched on the under side, the notches being of a size that will slip easily over the bolt D. At the rear end of the cross-bar B is hinged an extension handle E, which can be swung over to rest on the top of the cross-bar when not in use. The extension handle can be made as long as necessary to afford the necessary leverage.

To locate the coil of stock on the reel, the coil is rolled into position in front of the reel and between the horizontal braces G on the floor, then the cross-bar is tipped until the spool can be inserted through the hole in the coil. With the coil locked in position, the extension handle E is used to swing the coil off the floor. As the coil is raised, the bar C drops into place and provides the necessary support for the cross-bar.



Drawing of One-Man Stock Reel

# MARVEL SAWS

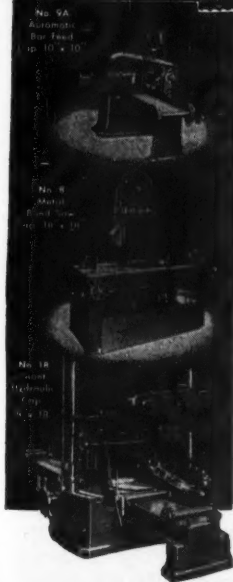
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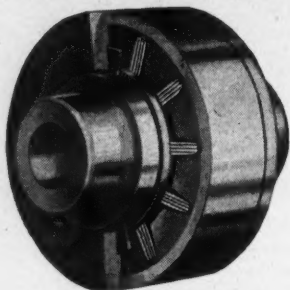
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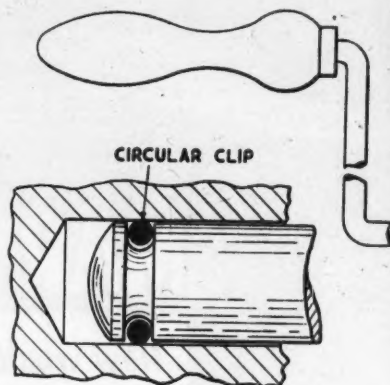
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## Assembling Wood Handles to Hand Cranks

By R. RICHARDS  
England

**W**E were recently confronted with the task of assembling wood handles to a number of hand cranks. The cranks were made from  $\frac{1}{8}$ -inch round steel rod, bent to provide the necessary off-set, and the problem consisted in attaching each handle to its crank in such manner that it would



Drawing Illustrating Method of Assembling  
Handle to Crank by Use of Spring Wire Clip

not easily come off, so that the crank could not project beyond the end of the handle, and so that the handle would revolve easily on the crank.

The solution lay in using a clip to hold the handle onto the crank, as shown in the illustration. The hole in the handle is drilled to a size that makes it an easy running fit on the crank. Near the end of the crank, where it slips into the handle, a groove is turned, as shown, to receive a circular clip made from a section of spring steel wire. The clip is sprung to a slightly larger diameter than the hole in the handle; thus the tendency of the clip is to press outward radial-

# SKILSAW brings production-line speed to crating and car-loading jobs!

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Put your shipping rooms on a real production basis with SKILSAW to speed *all* sawing. This powerful, *easy-handling* saw goes to each job and saves material handling. It pre-cuts lumber to uniform lengths and widths for quick assembly into crates. It sizes 2 x 4's swiftly and accurately *inside the car* for freight-car bracing. SKILSAW speeds uncrating, too . . . protects contents from damage in opening . . . salvages crating lumber for other uses.

Whatever the sawing jobs in your plant . . . in shipping, receiving, maintenance or production departments . . . SKILSAW will do them faster, better and with fewer men. Ask your distributor to prove it with a demonstration of SKILSAW *now!*

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Portland • Seattle • Toronto, Canada

**SKILSAW** PORTABLE ELECTRIC **TOOLS**  
★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★

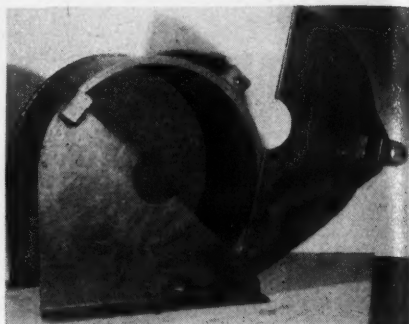


ly, exerting pressure against the wall of the hole in the handle.

The clip is a loose fit in the groove in the crank, however, so that while a considerable amount of force is required to push the handle over the end of the crank or to pull the crank and handle apart, when they are assembled the handle revolves freely on the crank and remains in position.

## Chamber for Speed-Testing Grinding Wheels

**T**O eliminate as far as possible the possibility of accidents from damaged or over-speeded grinding wheels, such as are used on portable grinders, the General Electric Company has designed the speed-test chamber shown in the illustrations. Tool cribs have been equipped with these chambers, and workmen are encouraged to bring



Speed-Test Chamber for Testing Grinding Wheels. Designed by General Electric Engineers for Use in G-E Tool Cribs

their grinders to the cribs for testing whenever there is any question as to the condition of a grinder or grinding wheel.

When a workman needs a wheel for a portable grinder, he takes his grinder to the tool crib. The attendant mounts the wheel on the spindle of

## SIMPLIFIED INTERNAL GRINDING with the MAJESTIC INTERNAL GRINDER



An exceptionally wide range of internal grinding jobs can be handled on the New Majestic Internal Grinder. Its simplicity of design and ease of operation are features of utmost importance in providing maximum grinding output at low cost.

### SPECIFICATIONS

Length of table, 48". Swing over table, 10". Travel of cross slide, 2 1/4". Precision dial graduated to .0001". Precision bearing work head. Speeds—100, 225, 350 r.p.m.

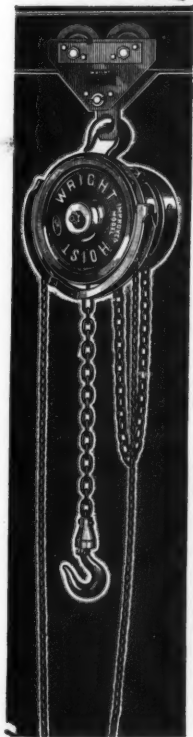
Write for complete details contained  
in New Bulletin

**Majestic Tool & Mfg. Co.**  
2950 E. Woodbridge Detroit, Mich.

**WRIGHT**  
*Improved High Speed*  
**HOISTS**



# WATCH LOAD HOOK!



**WRIGHT HOISTS** are built to carry more than their rated capacities, but like other well-made pieces of mechanical equipment they should *not* be overloaded. Overloading is dangerous to men and imposes excessive strain on the hoist. Certainly, this is no time to take chances with either men or machines.

**Watch the load hook.** Wright load hooks are drop-forged from special steel which, when subjected to overloading, give visible warning by opening slowly. When the load hook has started to open, look to the top hook too, for while it is stronger than the bottom hook, it also may be reaching a danger point. When hooks show the effect of overloading, replace them immediately with new ones. Remember: repair parts are both easier and cheaper to get than a complete new hoist.

Send today for a free Crane Signal Chart. This chart (36" x 24") illustrates the various crane signals—and the use of the Wright system of crane signals will speed crane operation and promote safety. Write for your chart today.

## WRIGHT MANUFACTURING DIVISION

York, Pa., Chicago, San Francisco, New York  
AMERICAN CHAIN & CABLE COMPANY, INC.  
BRIDGEPORT, CONNECTICUT

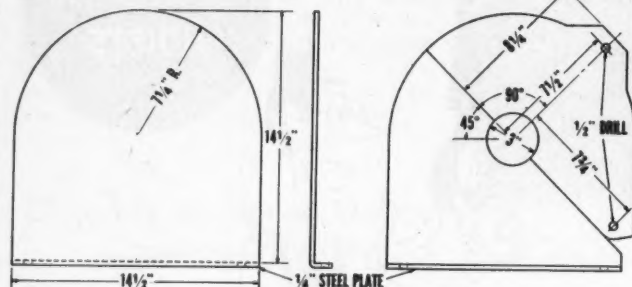


*In Business for Your Safety*



the grinder and then inserts the wheel end of the spindle into the speed-test chamber before applying power. Pow-

carrying the wheel. A spring-pin lock holds the cover in place while the test is being conducted.



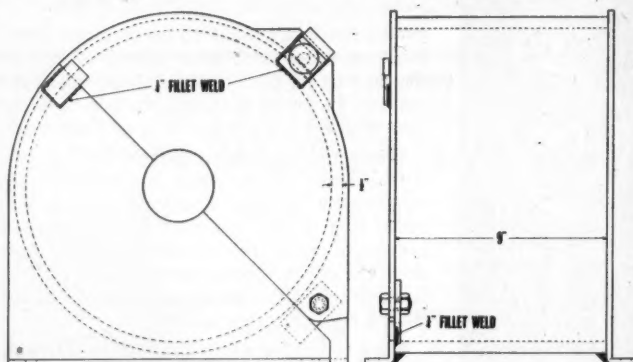
Drawing of End Plates for Speed-Test Chamber

er is applied and the performance of the wheel noted.

With the test chamber closed around the spindle, if the wheel should burst while being tested the attendant is protected against flying pieces. As an initial precaution, all new grinding wheels are tested at 50 per cent above normal operating speed before they are placed in stock.

The chamber is made from a section of pipe, although it can be made from steel plate, rolled to form a cylinder and welded. A solid section of plate is welded across one end to form a rear wall, and the lower half of a similar section, cut through the center as shown in the photograph, as welded to the front end. The upper half is hinged so that it can be swung out of the way to permit the insertion of the grinder spindle

hold the upper half in place when closed, and a spring lock holds the upper half of the front plate in closed position. The frame of the spring

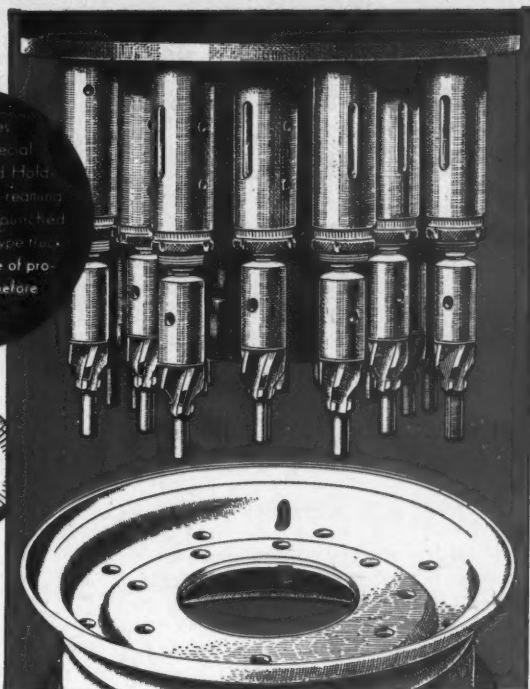
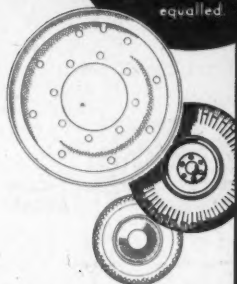


Assembly Drawing of Speed-Test Chamber

lock is welded to the hinged plate, and the block into which it latches is welded to the cylinder. A steel block is welded to the bottom of the lower front end plate to provide for hinging the upper plate.

While simple to make and economical as to cost, the use of these speed-test chambers eliminates the element

16 spindles  
of Gairing Special  
Cutting Tools and Hold-  
ers, simultaneously reaming  
and chamfering punched  
bolt holes in split-type truck  
wheels, at a rate of pro-  
duction never before  
equalled.



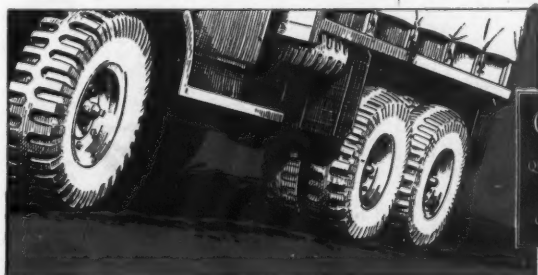
## ARMIES ON WHEELS

When the Automotive Industry rolled up its sleeves and went to war, it was given an assignment the results of which will rate high in modern military and industrial history. For the war vehicles it is producing has made a reality of a military necessity—Armies on Wheels: trucks, tanks, half-trucks, jeeps, et cetera—thousands and thousands

and thousands of them. Yes, the Automotive Industry has gone to war for its Uncle Sam—**enlisted for the duration.** And Gairing, as in the past, continues to pass the ammunition—continues to supply the industry with the fine cutting tools necessary for the precision production of the parts with which war vehicles are made.

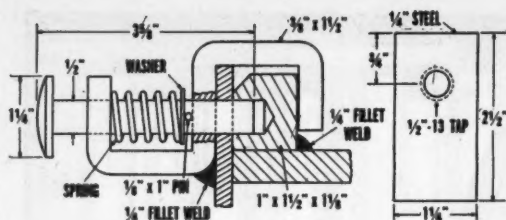
### THE GAIRING TOOL COMPANY, Detroit, Michigan

Manufacturers of Standard,  
Special and Gair-Lock  
Inserted Blade Cutting Tools



GAIRING  
FOR OVER A  
QUARTER CENTURY  
SPECIALISTS  
IN FINE  
CUTTING TOOLS





Drawing of Spring-Lock for Cover

of doubt as to the safety of a grinding wheel and provides insurance against the use of defective wheels.

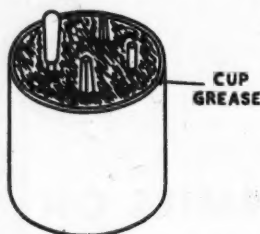
## Simple Holder for Drills and Small Cutting Tools

By A. H. WAYCHOFF

OF all the simple holders that have been invented to hold small drills, the holder shown in the drawing is

probably the simplest—and possibly the most efficient. The holder consists simply of a small can filled with hard, or “cup,” grease. The grease is hard enough to hold small drills in an upright position, yet soft enough so that the drills can easily be “stuck” into it and as easily withdrawn. The grease will not injure the cutting edges; on the contrary, it keeps the drills lubricated and thus aids in drilling.

Many other small tools can be held



The Most Efficient Holder for Small Drills—a Can of Cup Grease

## MILWAUKEE SURFACE PLATES



36" x 48" . . . semi-steel . . . accurately machined. Securely mounted cast legs are machined and provided with adjusting screws for perfect alignment. Shipping weight, 1300 lbs. Also larger or smaller plates with planed or scraped surface. We also manufacture angles and parallels as shown underneath surface plate. Write for details.

**J. C. BUSCH CO.**

Engineers and Machinists Since 1907  
126 E. PITTSBURGH AVE., MILWAUKEE, WIS.

in such a holder; jewelers' files, small diesinkers' tools, and so on. The delicate edges of the tools are protected against contact with other tools and hard substances and also against rust. When the grease has been poked full of holes it is an easy matter to smooth it over again.

## "MOLD YOUR OWN" LEAD HAMMERS

with this Lead Hammer Mold. Casts hammer heads over pipe or "Shur-Grip" malleable iron handles.

**Johnson Tool Co., Inc.**

Massasolet Ave.,  
E. Providence,  
Rhode Island

Also: Bench  
Vise Jaw Mold  
—for lead vise  
Jaws.



Write for  
Circulars  
and Prices  
Lead  
Hammers—  
all sizes  
in stock.

# Attention Gage Users!

**IMMEDIATE  
DELIVERY**

| CLASS OF SERVICE DESIRED |                 |
|--------------------------|-----------------|
| DOMESTIC                 | CABLE           |
| TELEGRAM                 | FULL RATE       |
| DAY LETTER               | DEFERRED        |
| NIGHT MESSAGE            | NIGHT LETTER    |
| NIGHT LETTER             | WEEK END LETTER |

## WESTERN UNION

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|--------------|
| CHECKED      |
| ADT'S BEHALF |
| TIME FILED   |

Patrons should check desired service desired; otherwise message will be transmitted as a full-rate communication.

WESTERN UNION, President

A. C. WILSON, First Vice-President

TO ALL GAGE USERS  
YOU ARE OFFERED IMMEDIATE DELIVERY  
FROM COMPLETE STOCK ALL MODELS ALL  
SIZES AGD ADJUSTABLE SNAP GAGES STOP  
ORDERS SHIPPED WITHIN 24 HOURS  
THE SHEFFIELD CORPORATION

### HOW TO ORDER

State Frame Model and Frame Size. Stipulate whether gage is to be set and sealed. Give complete marking instructions if set and sealed.

FOR SPECIFICATIONS  
**SEE** SHEFFIELD HANDBOOK  
No. 42-2

**PAGES 150-153**

THE **SHEFFIELD** CORPORATION  
DAYTON, OHIO, U. S. A.

**SHEFFIELD  
GAGES**

# QUICK MARKING FOR PART NUMBERS



MARKING  
BY ROLLING  
IS FAST AND  
ECONOMICAL.

PRESERVES  
DIE LIFE AND  
PIECE PARTS.

REQUIRES  
ONLY FRACTION  
OF APPLIED  
PRESSURE  
AS COMPARED  
TO STAMPING.

QUICK  
SET-UPS

**MODEL 25  
HI-DUTY  
MARKING  
MACHINE**

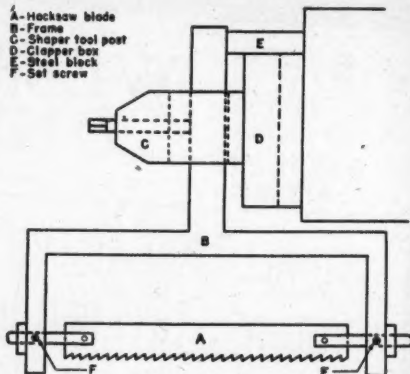
This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

**GEO. T. SCHMIDT, Inc.**  
1806 BELLE PLAINE AVE.  
CHICAGO, ILLINOIS

## Sawing Attachment for Shaper

WHEN small-dimensional material must be cut accurately and there is no power saw available to do the job, a shaper is occasionally used as

A-Hacksaw blade  
B-Frame  
C-Shaper tool post  
D-Clapper box  
E-Steel block  
F-Set screw



Plan Drawing of Attachment for Sawing in the Shaper

a mechanical saw at General Electric's Schenectady Works.

As shown by the sketch, the arrangement consists of a metal frame with two standard blade holders. The "handle" projects vertically so that it may be inserted in the tool post of the shaper. Block "E" is placed so that it holds the clapper-box rigid. The setscrews "F" prevent the blade from twisting.

## A Fire Hazard—and Method of Elimination

By ARTHUR P. SCHULZE  
Oakite Products, Incorporated

THE fire hazard is always present in shops where waste and wiping cloths are used to keep machinery



# *Citation of Honor*

ON THE PRODUCTION FRONT



The men and women of the Quality Tool & Die Company, of Indianapolis, have received the coveted Army-Navy "E" Award in recognition of outstanding accomplishments in the production of precision inspection gages.

We are indeed proud of this, the highest honor which can be paid to civilians for their contribution to Victory. The "E" pins, which we wear, will serve as an inspiration to even greater achievements in the days ahead.

I wish to take this opportunity to publicly express my deep appreciation to all the loyal workers whose devotion to duty and constant striving for improvement has brought this award to the Quality Tool & Die Company.

*Ray H. Rice.*  
General Manager

## *Quality*

### TOOL & DIE CO.

Manufacturers of "Quality Products"  
INDIANAPOLIS, INDIANA



and equipment free from oil and dirt, but it is not always recognized.

From the standpoint of safety, rapid disposal of oily, greasy waste and wiping cloths is essential wherever it is not practical to reclaim them. In numerous cases, however, reclamation is entirely feasible and under most conditions is an economical process. Such reclamation not only serves to eliminate this type of fire hazard, but also affords a means of improving maintenance.

As grease-covered, oil-soaked cloths accumulate, they are gathered at frequent intervals and deposited in ordinary oil drums or other suitable containers with covers, the containers being placed at convenient points throughout the plant. The drums are filled with a solution composed of water and a detergent or cleaning material.

The drums provide safe storage of the rags, thus automatically eliminating the possibility of spontaneous

combustion. At the same time, the rags are subjected to a preliminary soaking which, because of the solvent properties and vigorous, yet safe, detergent action of the solution, loosens much of the oil, dirt, and grease so that when the dirty rags are collected to be taken to the point in the plant where they are to be reclaimed, the subsequent washing operation is much easier than it otherwise would have been.

In addition to providing an additional safety factor, this practice has also been found a practical method of saving money on maintenance. In plants where several hundred pounds of cloths are used a month, the resultant expense is appreciable. Wiping cloths can easily be reclaimed, in most instances, at a cost that is only a fraction of their replacement value. As a matter of fact, they can be reclaimed at a cost of a few cents per pound, depending upon the class of service to which they are put and the

## REID All Electric Automatic Feed Surface Grinder No. 2B

A Proven  
Product for Over  
a Quarter Century  
with Thousands  
in Use Daily

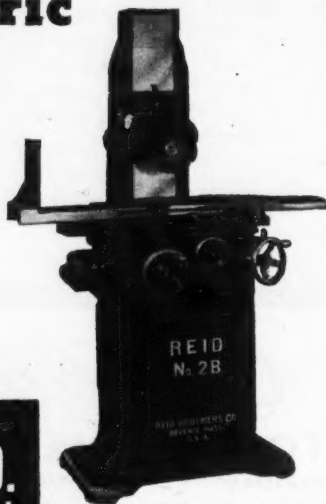
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Spindle

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EXCELLENT DELIVERIES

Exclusive Selling Agents

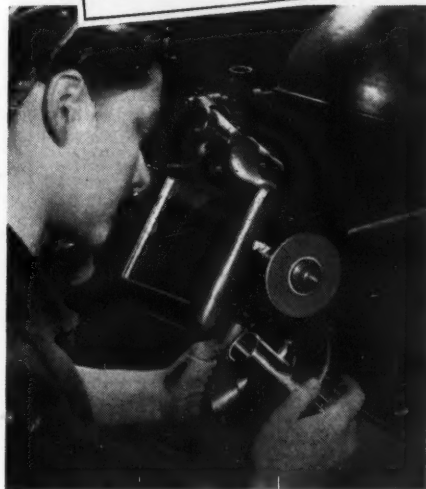
### H. LEACH MACHINERY CO.

387 CHARLES ST. PROVIDENCE, R. I.  
Agents in all Principal Cities Throughout the World





## A BIRTHDAY STATEMENT ABOUT "MX" WHEELS



**T**HE announcement of "MX" Wheels in 1942 introduced a new abrasive tool to industry.

These wheels were created by Carborundum to perform a specific function—the removal of "disturbed metal" such as burrs and tool marks, resulting from grinding, machining, boring and similar operations. Research and field tests showed "MX" Wheels could do this job better than ordinary finishing methods. A year's experience has confirmed their advantages.

"MX" Wheels, fabricated from cotton fibre intermingled with abrasive grains are unlike any other abrasive product. They have unique characteristics.



Because of their "cushioning" effect "MX" Wheels literally hug the work. Chatter and vibrations are reduced, smooth finishes assured.

"MX" Wheels are best suited for breaking corners, removing burrs and polishing grooves or slots. For burr removal on jobs where surrounding surfaces must be kept free of abrasive marks . . . or for polishing which must be done with light stock removal to maintain tolerance limitations . . . they are ideal.

A request addressed to us, Dept. MM, at Niagara Falls, will bring you literature further describing the wheel and illustrating a few of its many uses.

**THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.**

REG. U.S. PAT. OFF.  
**MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS**  
Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids  
(Carborundum and Alusite are registered trade-marks of and indicate manufacture by The Carborundum Company)

August, 1943

MODERN MACHINE SHOP 197

equipment available to do the washing.

Effective results are obtained on this type of work even with such a simple installation as open boil-out and rinse tanks. And where the volume warrants, washing machines or complete laundry equipment of wheels, extractors and dryer are used, increasing the direct saving. Still another advantage in reclaiming cloths is the fact that when laundered they are soft, clean, absorbent, and lint-free, with the result that the workmen usually prefer them to new waste material.

### Machine Shop Training Films

Sound-Motion Pictures produced especially for the purpose of training workers in machine shop skills are now available. Included are such subjects as the Operation of the Engine Lathe, Milling Machine, Drill Press, Precision Measurement, Bench Work, Single Point

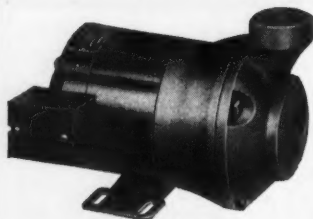
Cutting Tools, Shipbuilding Skills, and so on. The films were produced by the United States Office of Education on Machine Shop Work, and are available through Castle Films, Inc., 30 Rockefeller Plaza, New York City.

These films are now doing outstanding jobs in the training of new personnel in hundreds of plants, schools, and shipyards where they are in use. Experienced demonstrators carry the action; thus it is obvious that such a film will serve the purpose of demonstration better than it could be served by an actual workman running a real machine. In addition, the film can be re-run any number of times, and the moving picture can be seen to advantage by every member of a large class.

A catalog of available films and details as to operation can be obtained by writing Castle Films at the address given above.

**Sav-way Plug Gage Set.** A four-page folder illustrating and describing a complete set of 144 plug gages for holes from  $\frac{1}{4}$  to 1 inch is now being distributed by Sav-way Industries, 4869 E. Eight Mile, Detroit, Mich. Copy free upon request.

## Penrod



**MODEL P-10H**

Tank built especially for Model P-10H- $\frac{1}{4}$ . Pump can be supplied promptly. Made from heavy sheet steel and containing built-in baffle to collect chips. Lid can be removed to clean tank without disconnecting return pipe fittings. Model P-10H pumps are ready for immediate delivery. Phone or wire us for details.

Manufacturers of Machine Tool Coolant Pumps for years

**FLOYD PENROD & SONS**  
**TOOL & ENGINEERING COMPANY**

1208-1216 W. 2nd Street

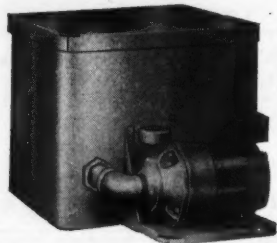
MUNCIE, INDIANA

## Centrifugal Coolant Pumps

**MODEL P-10H PUMPS ARE EASILY APPLIED**  
**PENROD PUMPS GIVE BETTER SERVICE**

Model P-10H pumps use the motor feet for mounting and can be located in any position as long as the liquid will flow into the pump by gravity. This pump is easily installed on old or new machines and is ample enough to handle single or multiple installations. Model P-10H- $\frac{1}{4}$  will pump up to 1200 G. P. H., and Model P-10H- $\frac{1}{2}$  up to 2400 G. P. H. Penrod pumps are conventional in style, but we have incorporated many new features such as replaceable seal assemblies, totally enclosed motors, grease sealed ball bearings, streamlined design, etc.

*Some jobber districts  
still open*





**STREAM-LINED**  
as a fighter plane



**HOLDS FIRM**  
as the Marines on Guadalcanal



**ACCURATE**  
as a Yankee sharpshooter

**EFFICIENT**  
as America's production lines



**IT HELPS WIN THE BATTLE OF PRODUCTION**

## Thompson SPRING COLLET Adapter

Designed in two simple parts, Thompson Spring Collet Adapter is quick and easy to apply... eliminates awkward, bulky chucks... gets closer to the work, yet allows free access.

A better adapter means faster, better work. The Thompson trademark means a better adapter!

Special wrench supplied with each adapter. Standard spring collets available on order.

Write for literature and prices



Army-Navy "E" awarded to  
Auto-Ordnance Corporation  
for excellence in production  
of "Tommy" Guns

# AUTO-ORDNANCE Corporation

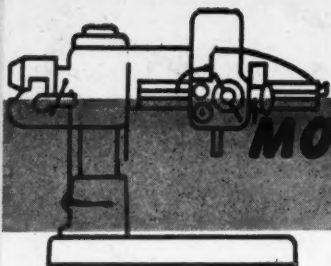
**THOMPSON TOOL DIVISION**

342 West Putnam Avenue, Greenwich, Conn.

GREENWICH • STAMFORD • BRIDGEPORT • NEW YORK

August, 1943

MODERN MACHINE SHOP 199



## MODERN EQUIPMENT AT WORK

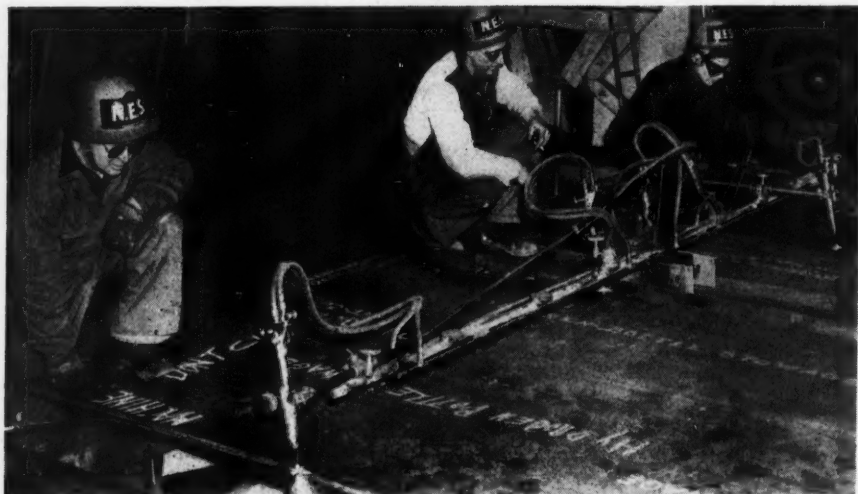
### Cantilever Bar Increases Radiagraph Output

**A** SHOP-BUILT device for multiplying the productive output of a portable Radiagraph cutting machine has been put to use in a New England shipyard, accomplishing in a single stroke the work normally produced by two or more machines. As shown in the illustration, the attachment consists of a 10-foot bar balanced crosswise on an Airco No. 4 Radiagraph, with the ends supported cantilever fashion by turnbuckled

rods welded at the apex to a plate section. This bar carries four torches in adjustable positions for trimming parallel edges simultaneously on two plates, one on each side of the machine tracks.

Not only is linear cutting quadrupled by this device, but plate edges are cut accurately parallel. The secondary benefit obtained is, of course, a more precise fit-up in assembly, with consequent speed-up of welding butt joints. Three operators are required to maintain torch adjustment, but on regular production work the

Multi-torch contrivance for plate squaring, powered by a standard portable Radiagraph cutting machine



*Prompt Delivery? ...Yes!*

But with Strict  
Adherence to Accuracy  
on "STANDARD" Seasoned

## PLUG GAGES



THE ACCURACY and economy of "STANDARD" Plug Gages is a byword and a "buy word" wherever precision parts are made. Even in today's constant clamor for speed, and more speed, the material, craftsmanship and accuracy of "STANDARD" Gages are faithfully maintained.

### *Conserve Vital Gage Steel . . . Increase the Life of PLUG GAGES with Hard Chrome Plating*

Salvage worn Plug and Ring Gages, save vital gage steel and conserve man and machine time with Hard Chrome Plating by STANDARD. Applied to new Gages as well as to Gages worn below original size, their life is increased 3 to 5 times.



### *Snap Gages*



SNAP GAGES designed for ease in handling and speed in inspection. "STANDARD" Snap Gages are standard equipment for fast, precise war production. Constant analysis of materials and precision inspection at every stage of their manufacture insure the quality, stamina and accuracy of these "STANDARD" products.

### *SUPER Snap Gages*

AN IMPROVED Snap Gage with spherical gaging pins that eliminate out-of-parallelism. Easily set, it requires no simultaneous adjustment to a given dimension and to parallelism. SUPER Snap Gage simplifies inspection, speeds production, insures greater accuracy and facilitates setting to closer tolerances. Write for special bulletin.



**Complete Stocks Ready for Immediate Shipment**

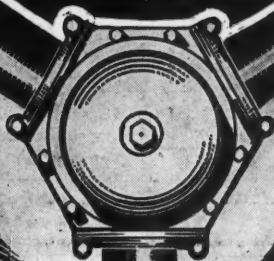


**STANDARD GAGE CO., INC., Poughkeepsie, N. Y.**



NORTON ABRASIVES

# *Quality Polishing* at Aircraft Speeds



## . . . . CALLS FOR ALUNDUM ABRASIVE

**S**PEED is the watchword in everything connected with aircraft production today. That's why Hamilton Standard Propellers at East Hartford uses Alundum Abrasive for polishing this barrel and many other parts.

Special Norton crushing and screening processes control the grain size and shape of Alundum Abrasive, giving sharp, strong grains that cut fast. Special surface treatments give the grains extra capillarity—the ability to stay in the wheel head until all their work is done.

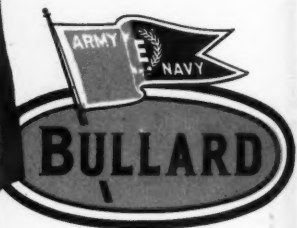
**NORTON COMPANY • WORCESTER 6, MASS.**

G-151

# PRODUCTION BOOSTER

## THE BULLARD MULT-AU-MATIC

Any part that can be chucked can be turned out faster on a Mult-Au-Matic because the seven working spindles, each with independent speeds and feeds, permit you to group cuts for maximum efficiency and minimum cutting time. Often a Mult-Au-Matic will finish a part requiring 25 or more separate operations in only a few seconds more than the time needed for the longest single cut. That's the way to boost production.



**THE BULLARD COMPANY** BRIDGEPORT, CONNECTICUT

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August

machine has produced 1,240 linear feet of cutting in eight hours. The average for a single Radiagraph at these yards is 300 feet per eight-hour shift.

The 40-foot track is laid in the trough of several sections of structural channel welded end-to-end, providing protection while plate is being laid out. Cumbersome lengths of gas hose are eliminated by the use of gas pipes mounted parallel to the torch bar. Four round mounting pads are welded at intervals on each side of the bar so that the torches can be fixed in any position along the bar, making fine adjustments by the rack and handscrew supporting each torch.

While this device is of limited application as compared to the large shape-cutting machines whose territory it trespasses upon, it is a very serviceable substitute in shops where the Travograph machines are overburdened with work which only they can do.

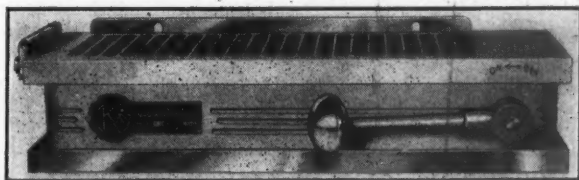
## Largest Gear Finisher

OVER 100 different sizes and types of gears, ranging from the minimum capacity of the machine (4 in. diameter) up to 4 ft. diameter and 12 in. face width have already been finished in quantity lots on this Michigan 865-48 rotary crossed-gear finisher. The machine is the largest standard shaving machine in use today.

Falk Corporation of Milwaukee, Wisconsin, originally obtained the machine for finishing single sets of pinions and gears but since its installation has found continuous use for the machine as more and more gear types were finished by the shaving process. The over 100 year types and sizes finished on this machine range from 3 to 10 diametral pitch, and include spur, helical and double helical types with both external and internal teeth.

As production schedules have been stepped up at Falk, a second machine

## KAR Permanent Magnet CHUCKS



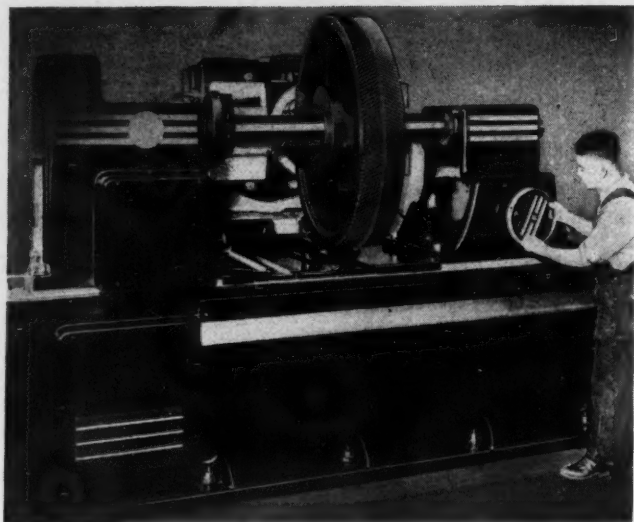
**Cannot Fail**  
**Hold Work Tight**  
**Generate No Heat**

An outstanding and exclusive advantage of the KAR Permanent Magnet Chuck is its ability to hold smaller pieces securely due to the close spacing of the pole pieces.

**Release Easily**  
**Used Wet or Dry**  
**Use No Power**



**THE KAR ENGINEERING CO., Inc.**  
GREAT BARRINGTON MASSACHUSETTS



Flexibility is Feature of Largest Gear Finisher, In Use at Falk Corporation Plant

a Michigan 24-inch and a Michigan 18-inch capacity machine. All the machines are of the rotary heavy duty type similar in appearance to the 865.

The Falk Corporation special-

of the same type has been added as well as a Michigan 865-36, capable of finishing gears up to 3 ft. diameter,

izes in large gears of the type that are used in connection with turbine drives for marine use.

### WHY YOU HAVEN'T GOT IT

The silk in 100 pairs of silk stockings would be sufficient for a parachute. The rubber in a raincoat equals the rubber used in a gas mask. Shellac that would make six phonograph records will waterproof the primer cups of 100,000 rounds of .30-caliber cartridges.

The aluminum in two coffee pots would provide enough of this material for the

construction of two large incendiary bombs. A pair of Army shoes takes twice the amount of leather that goes into a pair of men's dress oxfords. It takes all the wool that goes into 25 average wool blankets to equip and clothe a soldier for a year.

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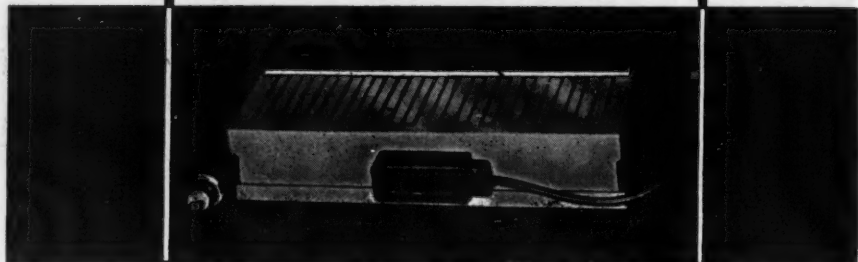
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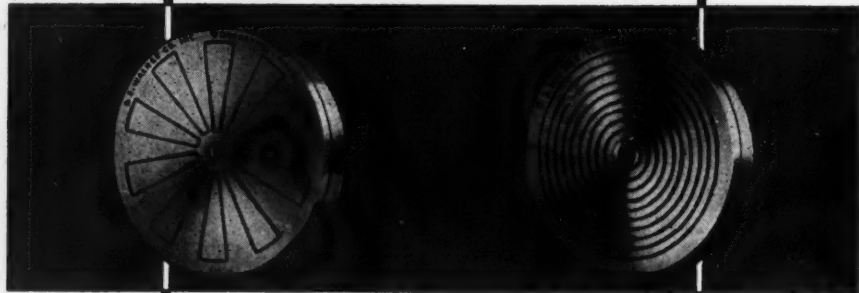


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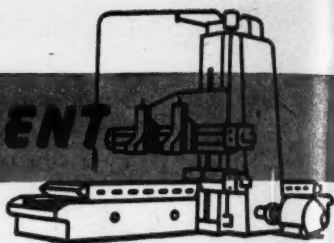
120 WALL STREET

NEW YORK

MODEL  
AA

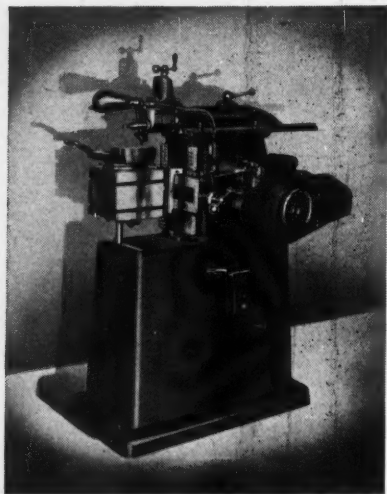
MODEL  
EE

## NEW SHOP EQUIPMENT



### 8-Inch Stroke Hy-Duty Shape-Rite Shaper

The illustration herewith shows an 8-inch stroke Hy-Duty Shape-Rite Shaper for precision work which is now being offered by Sales Service & Machine Tool Co., 2426 University Ave., Saint Paul 4, Minn. All working surfaces of the machine are ground and hand scraped and each machine part is closely fitted to ensure accuracy and long life. All gears except the bull gear and pinion are



8-Inch Stroke Hy-Duty Shape-Rite Shaper

enclosed and operate in oil. The bull gear and pinion are cut right-hand helical angle, and the drive gear is cut left-hand angle—a feature which is said to provide for a silent herringbone gear effect and additional smoothness, also eliminate gear tooth mark reproduction on work. All gears and drive shaft are

mounted on anti-friction bearings.

The column of the Hy-Duty Shape-Rite Shaper is heavily constructed, cross ribbed, and made of special alloy cast iron. The ways on the ram are of an extra heavy V-type and are designed extra long to avoid deflection. The rocker arm is linked at the top to the ram drive head. The slide block is made of hardened and ground tool steel and is closely fitted to ensure long life and reduce wear. The cross rail and table saddle are heavily constructed to ensure maximum rigidity.

The 8-inch stroke Hy-Duty Shape-Rite Shaper can be furnished with either plain or swivel table. According to the manufacturer, the unit is very easy to set up and operate, since all levers and controls are conveniently located on the operator's side of the machine. The motor is mounted on a hinged bracket to maintain proper belt tension. Alemite fittings provide for ample lubrication of machine throughout.

Standard equipment of the 8-inch stroke Hy-Duty Shape-Rite Shaper includes steel faced jaw swivel base vise, tool post wrenches, and motor drive arrangement less electrical equipment.

### Thompson Profile Milling Machine

Particularly adaptable to the production of irregularly shaped workpieces, including gun and aircraft parts, the Thompson Profile Milling Machine illustrated herewith has been brought out by the Earl A. Thompson Mfg. Co., 1300 Hilton Rd., Ferndale, Mich. The machine is designed for easy operation and is arranged so that loading and unloading of work are effected quickly without machine stoppage. A simple, direct method of control of the pieces being machined together with the extremely accurate and rigid construction of the machine itself allows for milling to close limits.

The head of the machine carries the



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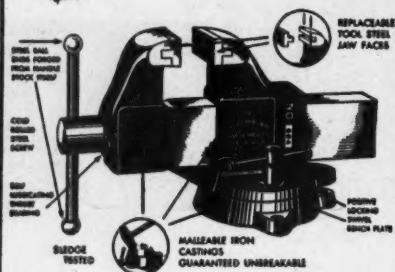
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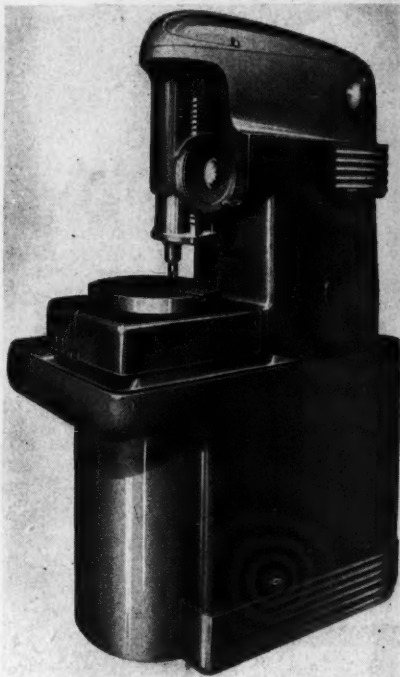


**THE COLUMBIAN VISE & MFG. CO.**  
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*The World's Largest Makers of Vises*

cutter spindle which is mounted on precision Timken bearings within the quill. The quill has a silent chain drive and is equipped with hardened, helical change gears which operate in oil. The head is provided with a 6-inch vertical adjustment and is adjustable to 0.001 inch in positioning for work.

Spindle nose has a standard No. 40 taper. The spindle and table are independently driven and controlled, the



Thompson Profile Milling Machine

spindle having a selective speed range of from 127 to 3,435 revolutions per minute.

Work is mounted on a 14-inch rotating table which is hydraulically controlled by a simple and accurate cam and follower mechanism. A ground hole in the center of the table facilitates positioning of work-holding fixtures. Two easily adjusted program discs determine rapid indexing cycles and automatic table stop to meet the requirements of a wide range of work.

The entire machine with the exception





## WAR HEADS for TIN FISH

**R**EADY to be loaded with explosives, these war heads of giant, one-ton aircraft torpedoes are getting a final inspection. Producing the surface finish shown in the photo, as well as the more than 5,000 component parts of a completed torpedo, requires top performance from machine tools and cutters.

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of loading and unloading operations is automatic, thereby assuring fast production of parts with uniform accuracy. The exterior of the machine is smartly streamlined.

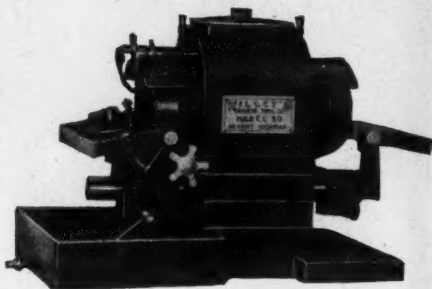
Other features of the machine than those mentioned above include automatic-hydraulic control of feed and rapid traverse; spindle quill lock; spindle drive clutch; brake; work table stop; and pressure and gravity lubrication system. In addition, all working parts of the machine are fully enclosed for safety and for protection from chips and dirt.

### Wiley's Model 50 Bench Grinder

The Wiley's Model 50 Bench Grinder illustrated herewith, product of Wiley's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich., is designed for use in the rapid wet or dry grinding of tungsten carbide tipped tools as well as other types of tool bits ranging up to 1½ inches square or equal cross sectional area. The machine is controlled by a drum-type reversing switch and is powered by a fully enclosed, ball bearing, 3,450 r.p.m., reversible type motor with bearing adjustment, the motor be-

ing available for operation on 110 volts, single phase current or 220/440 volts, 60 cycle three phase current.

The 6 x 12-inch tool rest tables of the

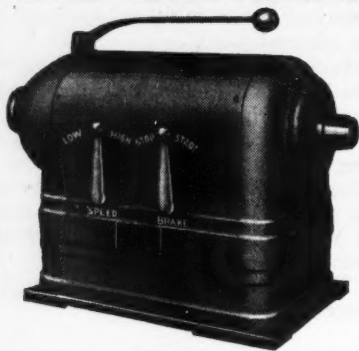


Wiley's Model 50 Bench Grinder

machine are constructed of semi-steel and are graduated for accurately setting to correct angles up to 15 deg. above and 30 deg. below horizontal position. The surface of each table is provided with a keyway for accommodating a protractor, tool guide, and dresser. Adjustment of each tool rest table to and from wheel is controlled by means of a

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Smooth automatic brake acts instantly when switch is thrown.

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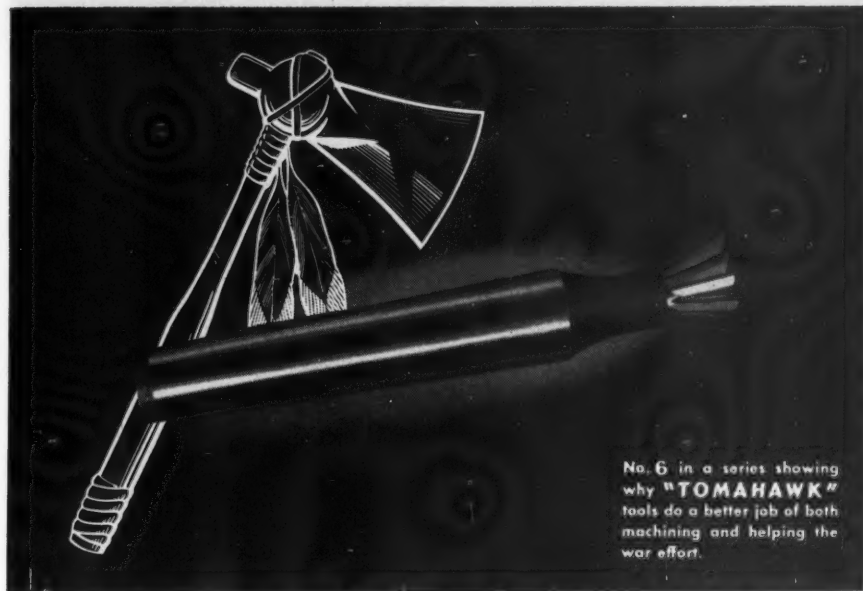
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Now many "TOMAHAWKS" like this end mill from Genesee have 'handles' of machine steel, butt-welded to the high speed steel cutting end.

In addition to conserving precious H.S.S., and simplifying production, the soft steel 'handle' improves the tool, since it provides hardness where hardness is needed (at the working end) and toughness and resilience where those are essential (in the shank).



**GENESEE TOOL COMPANY**  
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The Model No. 150 Heavy Duty Drill is of the Universal Quick Change Type with extreme flexibility of speed and feed changes. It has ample capacity to drive 1½" diameter high speed twist drills. It is also adapted to boring, counterboring, facing, forming and tapping operations.

To give increased flexibility to the machine the vertical column assembly is of 2-piece design; lower frame which bolts to base arranged to carry stand-ard plan table. The entire upper unit assembly with speed and feed train drives for rotating the spindles and for feeding spindles is mounted on the lower frame. Twelve quick changes of speed are provided.

Also built as single purpose type.

Further details are contained in a new attractive bulletin which is now available.

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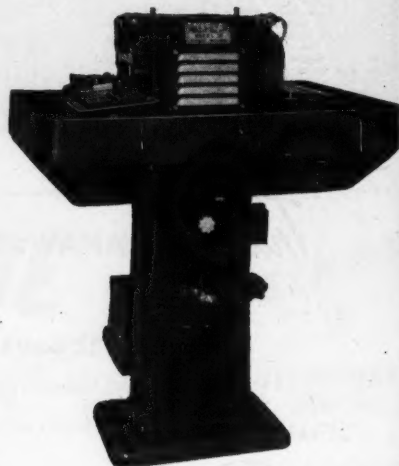
specially designed locking and releasing clamp.

Coolant is contained in a reservoir cast into the upper part of the machine and is gravity fed through control valves. A drip pan with removable drain plug is cast integral with the base of the machine.

Standard equipment of the Willey's Model 50 Bench Grinder includes two 6 x 1¼ x 2½-inch vitrified silicon carbide wheels with steel backs; protractor, and ¾ x 1½-inch diamond dresser.

### Willey's Model 30 Carbide Tool Grinder

Designed for use in the free-hand grinding of tungsten carbide tipped tools as well as other hard metal tools re-

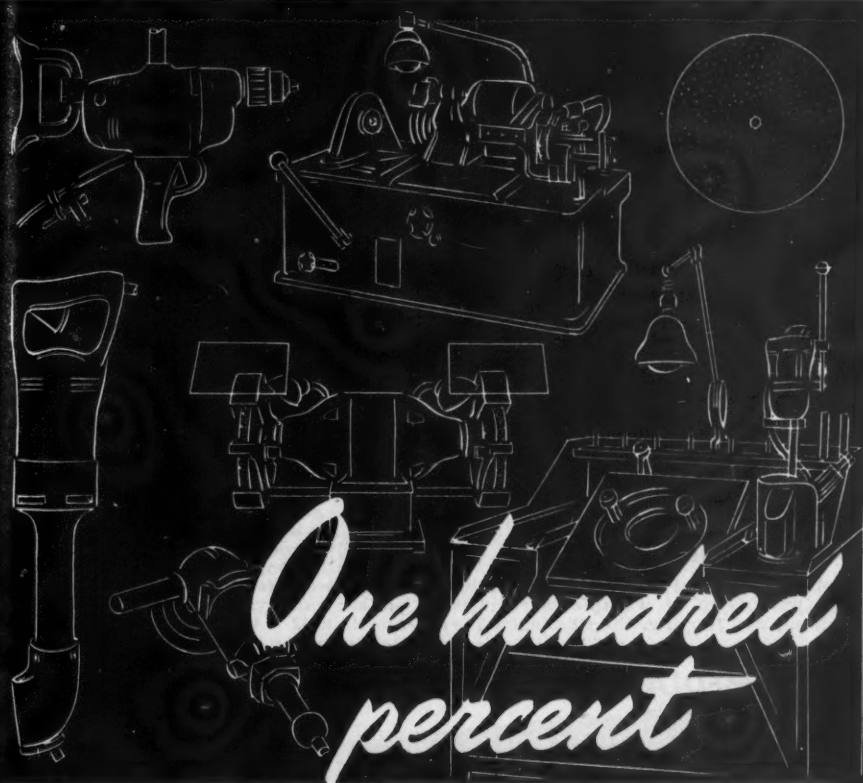


Willey's Model 30 Carbide Tool Grinder

quiring unusually keen cutting edges and extreme accuracy, the Willey's Model 30 Carbide Tool Grinder shown herewith has been brought out by Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich. The machine is sturdily constructed and is arranged for use with an 8-inch vitrified silicon carbide wheel for rough and semi-finish grinding operations and 6-inch diamond wheel for finishing operations. Cool cutting action of wheels is assured by a steady flow of coolant which is force fed by an electrically driven pump con-

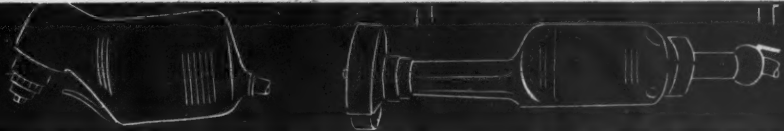
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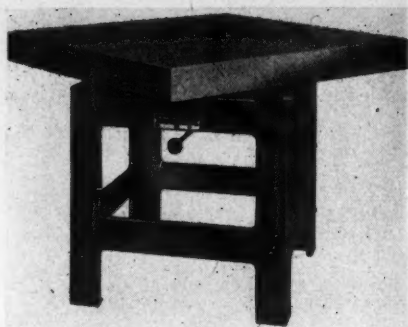
nected with a tank attached to the base of the grinder.

The Willey's Model 30 Grinder<sup>2</sup> is controlled by a drum type reversing switch and is powered by a fully enclosed, ball bearing, 3,450 r.p.m. reversible type motor with bearing adjustment, the motor being available for operation on 60 cycle three phase current, 220 or 440 volts. Each tool rest table of the machine is of semi-steel construction and has an angular adjustment from horizontal position of 30 deg. A keyway is provided in the surface of the table for a protractor, tool guide, and dresser. Adjustment of tool rest table to and from wheel is controlled by means of a special locking and releasing clamp.

Specifications of the Willey's Model 30 Carbide Tool Grinder are as follows: size of tool rest table, 16 x 7 inches; height of spindle above floor, 43 inches; diamond dresser,  $\frac{3}{4}$  x  $1\frac{1}{2}$  inches; floor space, 40 x 30 inches; net weight, approximately 450 pounds.

### Challenge Turn Table

Said to be ideal for use in the continuous production of workpieces requiring drilling and tapping, the Challenge Turn

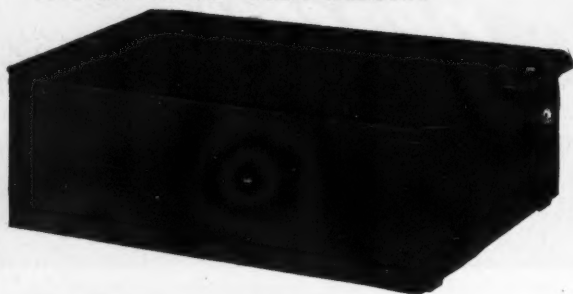


Challenge Turn Table

Table shown here has been introduced by The Challenge Machinery Co., Grand Haven, Mich. The design of the unit is such that one or more pieces of work can be locked in place at one end of the swivel surface plate for machining while work at the other end is being properly processed.

The Challenge Turn Table is available with two standard sizes of surface plates; namely, 30 x 30 x 3 inches thick and 42 x 42 x 4 inches thick. Each sur-

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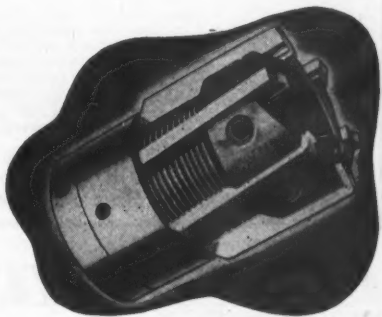
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ALSO available are the McCrosky Boring Bar Manual, the McCrosky Quick-Change Chuck Manual, and various bulletins and engineering data sheets covering all units in the McCrosky line of Cost Cutting Tools. Write to . . .



**MCCROSKY REAMER MANUAL**



face plate has four T-slots which are carefully machined from the solid. Tables with other sizes of surface plates can be obtained on special order.

The Challenge Turn Table is made in two different models, one of which includes a cast iron stand as shown in the accompanying illustration, and the other a low base to allow for use of table on machine beds. The stand model is 34 inches high while the drill base model is 9 inches high. A single-motion locking lever firmly locks the table to the stand. A special rim lock is provided on the low base model.

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A Midget  
in SIZE

A GIANT  
for WORK



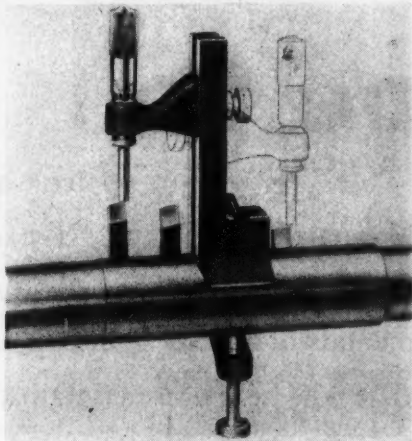
Cuts wire, rods or band iron easily and quickly. Any size wire or rod up to  $\frac{1}{4}$  inch round or  $\frac{1}{4}$  inch square and band iron up to  $\frac{1}{4}$  by 2 inches. Its small size and low price makes it possible to have more than one, mounted wherever convenient. Gauge can be set for repeated cuts to same length on both wire or band iron. **FREE TRIAL** in your own shop. Write for further information and prices.

**The Federal Foundry Supply Co.**

4606 East 71th St. Cleveland, Ohio

## Bartelt Model B Pedestal Micrometer

The accompanying illustration shows the Model B pedestal micrometer now being introduced by the Bartelt Engineering Co., 1216 Partridge Ave., Beloit, Wis. While designed primarily for use



Bartelt Model B Pedestal Micrometer

in the quick and accurate setting of closely-spaced boring tools, this unit can also be readily employed for a number of other gaging purposes.

The unit consists of a pedestal having a base with a wide V-opening and flat surfaces at the ends of the extensions. By means of the V-groove, the gage can be placed on a boring bar where it is held by a removable clamp which engages a slot in the top of the base. The flat surfaces enable the gage to be placed on a surface plate, a machine

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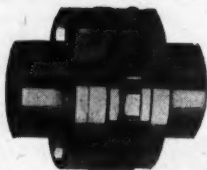
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# *A Stitch in Time*



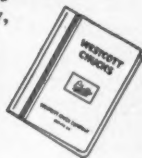
## ... MAY AVOID A BAD PRODUCTION LOSS

We can accept repair orders under Preference Rating Order P-100. And, of course, we will do our best to get the Chuck repaired and back to you quickly. But, with things as they are, we suggest you stock vital parts, and make repairs on the spot — to avoid delay, save production time, speed up the war effort. For list of vital repair parts, give us Serial Numbers of your Chucks. . . Westcott Chuck Company, 703 East Walnut St., Oneida, N. Y. — since 1872.

Write for Westcott Catalog No. 550.

**WESTCOTT**  
*Chucks*

PRECISION • DEPENDABILITY • SERVICE



bed, or any other plane surface from which measurements are to be made.

The upright portion of the pedestal is finished on both sides. An arm, which carries the micrometer head, is clamped to the vertical surface by means of a screw which is fitted through a slot in the upright. Since the pedestal is double-faced, the arm may be clamped to either side as desired and can be changed from one side to the other without changing the clamped position of the pedestal.

The base of the pedestal is made as short as possible, thereby enabling the gage to be fitted between boring tools having as little as 2 inches of space between them. Taking the overhang of the arm into consideration, boring tools located  $3\frac{1}{2}$  inches apart can be set without changing the pedestal by simply clamping the micrometer head first on one side and then on the other. The flat portion of the base permits the Model B pedestal micrometer to be used as a height or depth gage, for other machine setups, and for inspection work.

The pedestal is a casting with accurately ground base and vertical surfaces. The arm has a ground foot and carries a standard micrometer head. As a modification, a dial indicator reading

to thousandths or tenths may be substituted for the micrometer. All surfaces, except those which are ground or polished, are finished in black crackle. Three clamps which are designed to fit all size boring bars from 1 to 5 inches in diameter are furnished with the Model B.

### Clark Improved Hardness Tester

Clark Instrument, Inc., 10204 Ford Rd., Dearborn, Mich., announces an improved hardness tester for testing the Rockwell hardness of workpieces. Available in three models designated as the US8, US12, and US16, the unit is said to embody a number of features contributing to accuracy of measurement and speed of operation, including a frictionless spindle which provides a correct minor load at all times; a zero drag trip which eliminates friction or drag on the loading beam, thus ensuring consistent accuracy of the major load; a dial indicator adjustment, affording a convenient, simple means of maintaining accuracy of readings; and a minor load adjustment.

Other outstanding features of the



**The UNUSUAL LUERS Patented Threading Tool enables you, MR. MECHANIC, to chase threads—BETTER THREADS—from 25% to 50% FASTER.**

### WHY?

**Ask for a circular.**

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BY

12 PINE ST.

## J. MILTON LUERS

MT. CLEMENS, MICH.

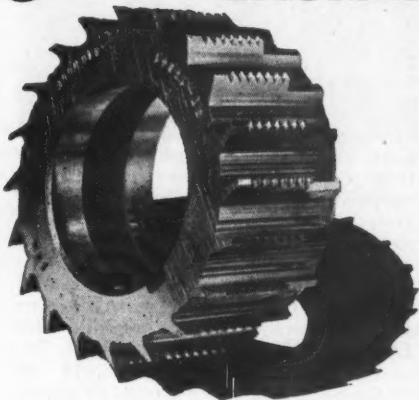
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# WAR-TIME SHOP RECIPES

# MAKE *Sharpening* EASIER

No. 4  
in a series

Parts produced with this Detroit Tap and Tool combination thread milling and boring cutter were superior to those produced with competitive spiral gashed cutters.



GROUND TAPS, THREAD GAGES,  
THREAD HOBS & SPECIAL THREADING  
TOOLS. SPECIAL TAPPING MACHINES

For many years it had been the accepted practice in certain high precision thread milling operations in aircraft engines to use spiral fluted hobs. Today, as the result of a suggestion from Detroit Tap engineers, straight fluted hobs like the one above are used for this operation.

**Result No. 1:** Even relatively untrained women can sharpen these cutters accurately now, whereas the spiral fluted types were very difficult to sharpen.

**Result No. 2:** Thread accuracy is even better than with the spiral fluted hobs.

**The reasons:** The main purpose of spiral-fluting is to reduce impact. In internal milling with more than one set of teeth in contact at one time, spiral fluting is frequently unnecessary. Straight fluted hobs are always easier to sharpen accurately than spiral fluted types.

This is just one of the many examples of how Detroit Tap field engineers have helped to improve accuracy, simplify production, and reduce cost in threading operations. Sometimes a little change will make all the difference. They'll be glad to help you too.

BUY  
U.S. BONDS  
STAMPS

# DETROIT

TAP & TOOL CO.

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DETROIT, 11  
MICH. U.S.A.

## BLEEDING FLOORS

NEED

## SPEEDI-DRI

Ever check up on your porters an hour or two after they've scrubbed and scoured the oily, greasy floors in your plant? Ever notice how, in hot weather, oil and grease "bleed" out of the old deposits, just as though the floors hadn't been cleaned at all? That's not the porter's fault. It's your fault. If your floors are cleaned with SPEEDI-DRI they won't bleed, because SPEEDI-DRI draws old oil stains out of wood, concrete, or metal.

SPEEDI-DRI sets up an immediate non-skid surface. It acts as a fire retardant. It brightens and lightens the whole room. It saves workmen's shoes from oil-rat. It conserves vital manpower because it is easily spread by hand and as easily cleaned up. For all-around effectiveness there is no other product that can compare with SPEEDI-DRI.



Write for a generous, free sample and test it in your own plant.

**SPEEDI-DRI**  
OIL AND GREASE ABSORBENT

### SUPPLIERS

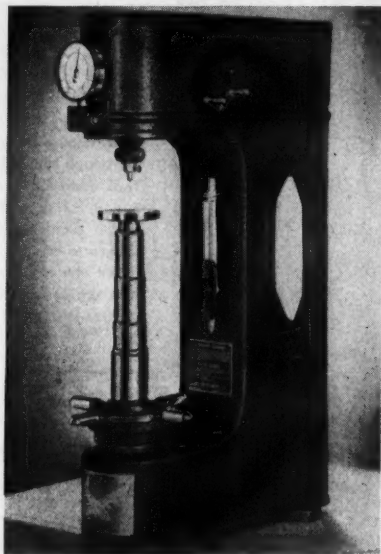
East — REFINERS LUBRICATING CO.  
New York 1, N. Y.

Midwest and South  
WAVERLY PETROLEUM PRODUCTS CO.  
Philadelphia 6, Pa.

West Coast  
WAVERLY PETROLEUM PRODUCTS CO.  
Menlo Park, Calif.

tester include a fully enclosed elevating screw with self-lubricating oil reservoir, and an adjustable steady rest. The unit is supplied complete with diamond cone penetrator and steel ball penetrators for testing on "C," "B," and most other standard Rockwell scales.

Three anvils are included; namely, a standard 3½-inch anvil for large flat bearing surface work; a spot anvil for most standard size pieces and for use



Clark Improved Hardness Tester

with test blocks; and a "V" anvil for testing round and cylindrical parts. These anvils are in addition to the two smaller "V" anvils that form part of the adjustable steady rest.

## Jones Bench Grinder and Polishing Machine No. 135

Jones Engineering Co., Dept. B-2, Ellwood City, Pa., announces the addition of a combination bench grinder and polishing machine designated as the No. 135 to its line of abrasive belt grinding equipment. Ruggedly constructed, the unit can be readily mounted on practically any shop bench for use in debur-

- 1 Corrects gear cutting errors of index, helical angle, tooth profile, eccentricity, and tooth roughness.
- 2 Applicable to spur gears, helical gears, cluster and shoulder gears, and internal gears.
- 3 Produces a uniform product so that proper allowances may be made for consistent heat treat distortion.
- 4 Requires only a small fraction of the machining time required by grinding, for the same quality of product.
- 5 Gears shaved and hardened are free from microscopic cracks in the tooth surfaces such as occur in ground gears.
- 6 Ground gears must pass a Magnaflux Test in order to discard those having these microscopic cracks which contribute to hazardous failures.
- 7 Tooth profiles are smooth and free from flats such as produced by some methods of grinding.
- 8 ELLIPTOID tooth form to eliminate end bearing can be produced at no extra cost.
- 9 The shaving operation is fully automatic; consequently, no skilled operators are needed.
- 10 Materially reduces gear noise and improves gear operation.
- 11 Produces uniformly high quality gears with a minimum of supervision.

MACHINES AVAILABLE FOR  
GEARS  $\frac{1}{4}$ " P.D. TO 96" P.D.

Send for descriptive  
bulletin on **RED  
RING Crossed Axes  
Rotary Gear Shaving.**



SPECIALISTS ON SPUR AND HELICAL  
INVOLUTE GEAR PRACTICE

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AND ELLIPTOID TOOTH FORMS

*Advantages of*  
**RED  
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GEAR TOOTH  
SHAVING**

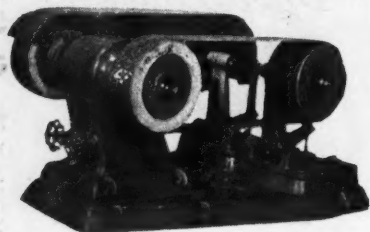


**NATIONAL BROACH  
AND MACHINE CO.**

RED RING PRODUCTS  
5600 ST. JEAN - DETROIT, MICH.

ring, grinding, and finishing flat and irregularly shaped workpieces.

The Model No. 135, which employs fast-cutting endless abrasive belts, is equipped with a patented, cushioned,



Jones Bench Grinder and Polishing Machine  
No. 135

segment face contact wheel and Jones 3/M rubber contact roll, the latter being available in a wide range of sizes for performing special jobs. The machine features a sturdy, one-piece base and precision ball bearing construction throughout. Controls for making belt alignment adjustments are located at the front of the unit, handy to the operator. An adjustable spring tension device on

the idler pulley maintains belt tension.

The Jones Bench Grinder and Polishing Machine No. 135 may be used with any  $\frac{1}{2}$  to 2 h.p. motor. Since the unit is designed so that the motor can be mounted underneath bench away from dust and dirt, an enclosed-type motor is not required.

### Johnson Wet Cutting Model Metal Band Saw

Johnson Mfg. Corp., 5000-4 Chrysler Bldg., New York, N. Y., announces that its metal band sawing machine is now available in a wet cutting model which is said to be particularly adaptable to unusually high speed cutting operations.

The coolant pump, which is mounted in the frame of the machine without impairing overall streamlining, is a non-clogging piston type and is driven by a noiseless cam from the regular drive gear of the saw, thus eliminating the need for a separate motor. Ingenious power take-off eliminates necessity of special wiring and extra switches. The speed of the pump is automatically regulated by the speed of the machine, the flow of coolant being in direct relation

## ★ ★ Equip Your Shop with These Time-Saving Economy Tools



### TYPE A—STEP JAW DESIGN

Especially adapted for holding work with short bores while being machined between centers on lathes, grinders, millers, shapers, etc.

| Size No. | Range of Bores Taken   | Net Price |
|----------|------------------------|-----------|
| 1A       | $\frac{1}{8}$ " to 1"  | \$12.00   |
| 2A       | 1" to $1\frac{1}{2}$ " | 16.00     |
| 3A       | $1\frac{1}{2}$ " to 2" | 23.00     |
| 4A       | 2" to 3"               | 34.00     |
| 5A       | 3" to 4"               | 40.00     |

(Other Sizes Taking Up to 7" Bores) Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Write for bulletin.



### TYPE B—STRAIGHT JAW DESIGN

Adapted for work with both short and long bores.

| Size No. | Range of Bores Taken                 | Net Price |
|----------|--------------------------------------|-----------|
| 1X       | $\frac{1}{8}$ " to $\frac{1}{4}$ "   | \$10.00   |
| 2X       | $\frac{1}{4}$ " to $2\frac{1}{32}$ " | 11.00     |
| 3X       | $2\frac{1}{32}$ " to $\frac{3}{4}$ " | 12.00     |
| 00       | $\frac{3}{4}$ " to $1\frac{1}{8}$ "  | 14.00     |
| 1        | 1" to $1\frac{1}{4}$ "               | 18.00     |
| 2        | $1\frac{1}{4}$ " to $1\frac{3}{4}$ " | 21.00     |
| 3        | $1\frac{3}{4}$ " to 2"               | 29.00     |
| 4        | 2" to $2\frac{1}{2}$ "               | 40.00     |

**W. H. NICHOLSON & CO., 136 OREGON ST., WILKES-BARRE, PA.**

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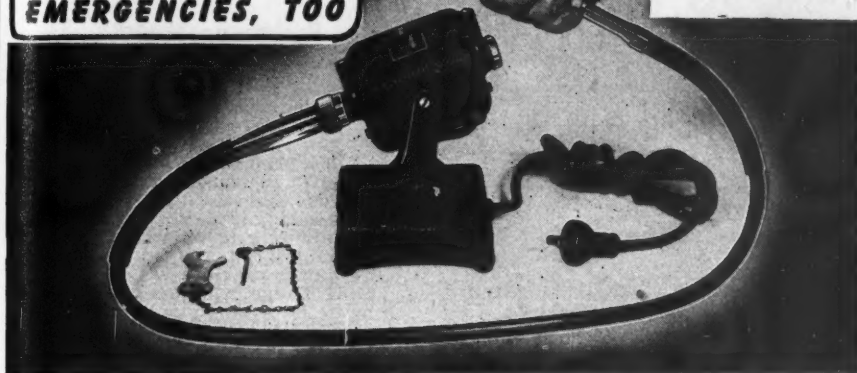
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August,

**THOSE FOREDOMS ARE TOPS  
FOR DE-BURRING AND  
OTHER LIGHT PRODUCTION  
JOBS. WE SPOT  
'EM EVERYWHERE FOR  
EMERGENCIES, TOO**



## Foredom FLEXIBLE SHAFT MACHINES

- can be used on all metals as well as plastics, porcelain, wood, etc.
- use hundreds of different accessories.
- have 4 types of readily interchangeable handpieces.
- are portable, yet sturdy; easy to handle, yet rugged.
- get into tight corners and irregularly-shaped parts.
- are adaptable to hundreds of regular and emergency uses.

*No matter what kind of equipment you have  
— no matter what type of work you do —*

**FOREDOMS CAN BOOST YOUR PRODUCTION!**

There's a reason why Ford, Bendix, Westinghouse, Allis-Chalmers, Curtiss Wright and many other war plants are equipped with Foredom Flexible Shaft Machines! Foredoms eliminate many types of old-fashioned, time-consuming hand work and thus speed up produc-

tion. Foredoms are just as ready to "pinch hit" in emergency breakdowns. Models from \$17.50 to \$48.75.

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**Excellent For Use  
On Irregularly  
Shaped Parts**



**Touching Up  
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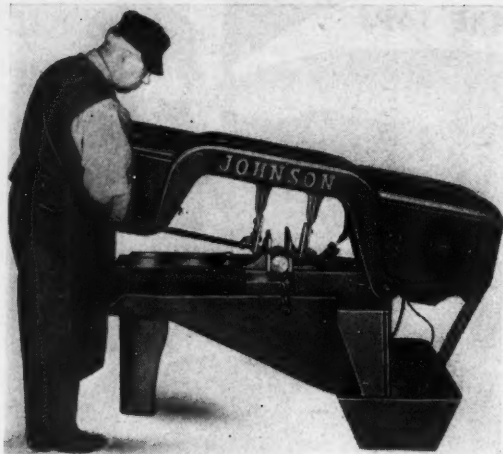
**FLEXIBLE SHAFT MACHINES**

SOLVE MANY PRODUCTION AND MAINTENANCE PROBLEMS

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Please send us your new catalog No. 415, showing the different uses of Foredom Flexible Shaft Machines.

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Johnson Wet Cutting Model Metal Band Saw

equipped with the mechanism for this coolant feature.

### Ruthman Model "TL" "Gusher" Coolant Pump

Designed for unusually deep immersion, the Ruthman Model "TL" "Gusher" Coolant Pump illustrated herewith, product of The Ruthman Machinery Co., 1817 Reading Rd., Cincinnati, Ohio, is said to be capable of handling soluble coolants containing grit and abrasives without injury to the mechanism. The unit is provided with an integral

mounting flange which is designed for bolting to the reservoir cover or bedplate.

According to the manufacturer, no packing glands or friction seals are employed in the construction of the Model TL pump, nor are there any bearings or metal-to-metal contacts below the

to blade speed. The pump automatically stops and starts with the machine, and a steady flow of coolant is assured through the use of a ram which smooths pump impulse. If dry cutting is desired, the pump can be readily disconnected. Johnson Saws now in use may be easily



National Tools have an International Reputation

Hobs  
Gear Cutters  
Gear Shaper Cutters  
Milling Cutters  
Reamers  
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Slitting Saws  
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Special Tools

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To make accurate tools  
and permanent friends



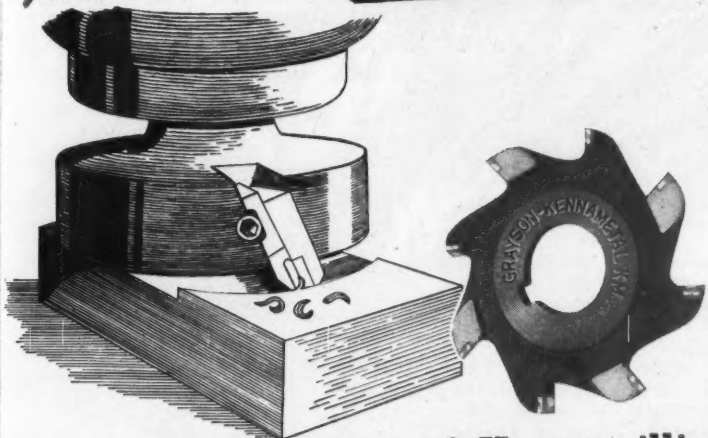
The NATIONAL TOOL Co.

11200 MADISON AVENUE

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★ SECOND IN A SERIES ★

## *This simple* **KENNAMETAL** *cutter*



### Was the beginning of Kennamilling and a NEW ERA of MILLING STEEL

**KENNAMILLING**, variously called "Hyper-milling" or "Super-milling", was begun when this simple cutter began to skid chips from hard aircraft steel.

Until 1940 the milling of steel was confined to the slower, high speed steel cutting tools. With the introduction of **KENNAMETAL**, however, with its inherent transverse rupture strength and non-galling properties, efficient milling of steel became possible. The strength and hardness of **KENNAMETAL** steel-cutting carbides now have been combined with the rugged Meehanite bodies of **GRAYSON** milling cutters to form the **GRAYSON-KENNAMETAL** shock-resistant milling cutters, designed for maximum production on milling operations on all metals.

The cutter illustrated—with only one cutting tool—replaced an eight-flute high speed steel mill, stepped up the cutting speed from 80 rpm to 323 rpm, and increased the table feed per minute from  $\frac{1}{2}$ " to  $3\frac{1}{2}$ ".

This single **KENNAMETAL** cutter produced as many pieces per grind as the eight-flute high speed steel mill, but in only one-seventh the time. During the job, even more time was saved on grinding than on cutting.

**KENNAMETAL** milling cutters, like **KENNAMETAL** boring and turning tools, produce more finished parts per machine per day.

Write for information about **KENNAMILLING** and solve your milling problems.



**KENNAMETAL Inc.**

300 LLOYD AVE., LATROBE, PA.

Trade Mark Reg. U. S. Pat. Off.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York  
(Exclusive of Canada and Great Britain)



## 4 MORE ACES UP UNCLE SAM'S SLEEVE



*Precision-machined, precision-ground  
on all diameters and threads.*

Elevating shafts . . . vertical training shafts . . . screw leveling shafts . . . just so many metal parts to the uninitiated. To the Jap pilot in a Zero, however, they mean anti-aircraft fire too accurate for comfort. These vital parts of an anti-aircraft gun are typical of the ability of Ace to do fine precision-work on a mass-production basis.

**RELY ON ACE FOR PRECISION GRINDING** Centerless, Internal Cylindrical, External Cylindrical, Blanchard Surface, Plain Surface, and Thread Grinding.

**PRODUCTION MACHINING** Turning, milling, drilling, cutting, tapping, and threading of small machine parts that require precision grinding —on a mass-production basis.

**METAL STAMPING** Blanking, forming, and extruding of small metal parts on presses up to 75-ton capacity. Spot welding, sub-assemblies and assembly of intricate radio and machine parts.

**HEAT TREATING** Electric and gas furnaces, individually pyrometer controlled, for high-heat, quenching, and carburizing of parts up to approximately 10" x 10" x 15".

**TOOL AND DIE WORK** All operations for the production of Punches and Dies for small stampings, for Jigs, Fixtures, Gages, Moulds, Form Blocks, Tool Bits and Circular Form Cutters.

*Send Blue Print, Sketch, or Sample to*

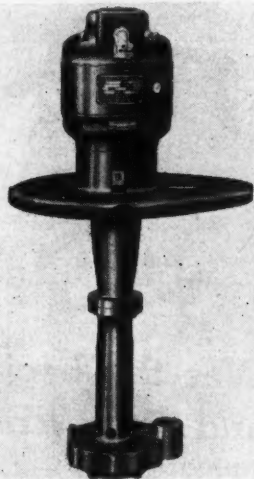


**ACE  
MANUFACTURING  
CORPORATION**

*for Precision Parts*

1235 E. ERIE AVE., PHILADELPHIA 24, PA.

mounting flange. The shaft, which rotates on two large high grade ball bearings and is of one-piece construction, is accurately ground to ensure balance and extends from the motor through the tubular housing to the pump impeller. One ball bearing is mounted in the upper motor end bell and the other within the mounting flange housing, thus providing sufficient distance between the ball bearings to maintain rigidity in the heavy shaft extension. The weight and thrust of the vertical shaft are taken by the



Ruthman Model "TL" "Gusher" Coolant Pump

large lower ball bearing which is locked into position, thus eliminating, it is claimed, any possibility of change in the position of the pump impeller both before and after the motor reaches its normal operating temperature.

The Ruthman Model TL Gusher Coolant Pump is available in lengths of 19" and 23½ inches from the mounting flange to the bottom of the pump and can be equipped with a ½ h.p. totally-enclosed motor for continuous duty and ¾ h.p. motor for extra heavy duty.

### Matthews Inspector's Kit

Designed for use by inspectors in the marking of precision parts and assemblies with acid etching inks, the Matthews Inspector's Kit illustrated here-

# More production per worker!



## FOOT CONTROL LEAVES BOTH HANDS FREE TO WORK!

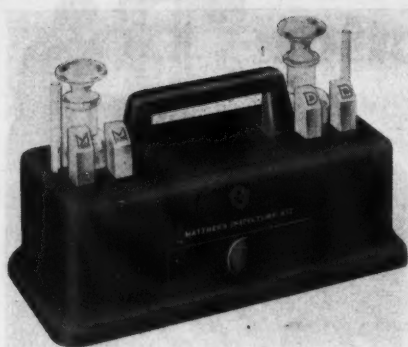
**Features:** Vise opens and closes instantly... Remains open or closed without constant foot pressure... Exerts grip of 15 times air-line pressure... Measures 12 x 6 1/2 x 6 in.... Jaw width 3 in... Jaw depth 2 in... Maximum opening 3 in... Maximum travel 1/2 in. Attaches to air line or individual compressor.

**SPEEDY AIR VISE**  
complete with Foot Control  
Valve, Air Hose and Fittings... **\$24**

Want more production? Follow the example of leading war plants — put *Speedy Air Vises* to work! This foot-controlled, pneumatic vise leaves operator's both hands free for safe, fast insertion and removal of work. You'll find it cuts time, labor and costs, reduces fatigue. Sturdy, compact, precision-built... so low in price it can be economically used on every drill-press, miller, filer and assembly line. Prompt delivery. Ask your distributor or write for details.

**W. R. BROWN CORP. 5725 ARMITAGE AVE. CHICAGO, ILL.**

AMERICA'S MOST TALKED ABOUT VISE AT A PRICE!



**Matthews Inspector's Kit**

with has been placed on the market by Jas. H. Matthews & Co., 3944 Forbes St., Pittsburgh, Pa. Light in weight and arranged for convenient carrying by inspector, the kit is made of an acid-proof, non-critical material and holds four "S-22" Synthetic Stamps, a bottle of acid etching ink, and a bottle of oil or neutralizer. The kit can also be made to hold more than four stamps if

desired. A stamp pad is located in the drawer at the front of the unit, the drawer being arranged for quick and easy pulling out for reinking pad by means of a glass tube.

To mark a part, the inspector selects the desired stamp, tilts the self-closing cover on the top of the kit, and inks the stamp by touching the pad underneath. After the stamp is inked and withdrawn, the cover closes automatically so as not to allow acid fumes to escape. After the part has been marked, the inspector places a drop of oil or neutralizer on the impression, thus neutralizing the acid.

### **Acromark Press Style Type Holder**

Stamping of several lines of letters and figures in any desired locations on metal or plastic name plates or parts is said to be easily and accurately accomplished through the use of the Acromark Press Style Type Holder illustrated herewith, product of The Acromark Co., 9 Morrell St., Elizabeth, N. J. The holder is made from a single piece of shock-resisting tool steel, the shank being turned to proper size to fit the

## *For Fast Delivery* **ORDER CULLMAN SPROCKETS**



Specialized experience and equipment for manufacturing sprockets are your assurance of the quickest possible delivery on sprockets made to your specifications.

In addition there are more than 50,000 Cullman Sprockets in stock ready for immediate shipment. Send for Cullman catalog of essential information to sprocket users.

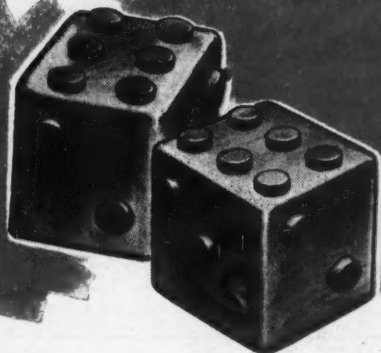
**CULLMAN WHEEL COMPANY**

1352 V ALTGELD STREET

CHICAGO ILLINOIS

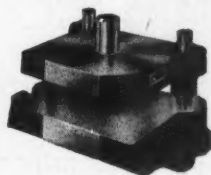
# "BOX CARS"

for  
**ADOLF**



That odd name came from the shop where strange cubical structures are daily welded and machined. It is known that they are war material, destined to go on to other American workers who will fit them into structures for the defense of America and the defeat of the Axis.

Along with them, and huge weldments for the Navy, move die sets from the size of your hand to the huge six ton slabs of metal that stamp out airplane wings, tank sides, portable air fields; and we know not what, for the defense of America and the defeat of the Axis.

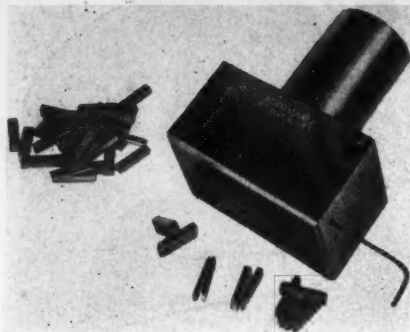


## DANLY

## DIE SETS

*Welded Steel Fabrication*

**DANLY MACHINE SPECIALTIES, INC., 2100 So. 52nd Ave., Chicago, Illinois**



Acromark Press Style Type Holder

press in which the holder is to be used.

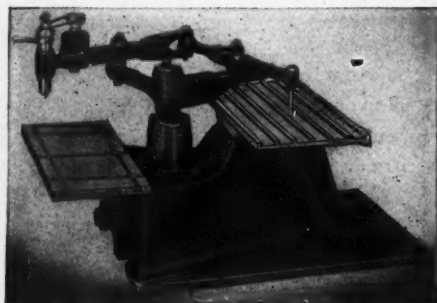
The type is made of a selected grade of high carbon tool steel which is engraved with a heavy bevel and hardened to withstand severe use. Each line of type is held in position by a hollow head set screw. So as not to detract from the strength of the holder, these set screws are alternately placed in the ends of the holder. A spacing bar is accurately pinned and permanently welded in the holder between each line of type.

## Hammond Improved "600" Abrasive Belt Grinder

Improvements in the design of its "600" abrasive belt grinder are announced by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. Available in two types designated as the Hammond "600" Dri and Hammond "600" Wet-N-Dri, the improved machine incorporates a heavier and larger cast base as well as larger sludge pan and new pulley-motor mountings which are easily adjustable from outside the base.

According to the manufacturer, the Hammond "600" Abrasive Belt Grinder can be adjusted from a vertical to horizontal position while in operation. The belt tension and tracking device can likewise be adjusted while the machine is operating, the adjustments being quickly made by two conveniently located handles. The work table can also be adjusted to any desired working angle.

Available in both bench and floor models, the machine is totally enclosed for safety and, in the "600 Dri type, is arranged for use with an individual dust collector or for connection to an exhaust system. The abrasive belt pulleys are



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## PROFILER - ENGRAVER

Engraves: Iron, Soft Steel,  
Copper, Brass, Aluminum,  
Plastics

**PROFILES + DUPLICATES + ENGRAVES**

Larger Working Area

Larger Engraving Area

More Ratios 1:1 to 2:1 by Eighths or "Special"

Variable Spindle Speeds

Easily Operated by Women

PRICED FROM \$225.00. Write for complete details.

# AUTO - ENGRAVER COMPANY

1776 Broadway  
New York, N. Y.

# L-W

## HIGH SPEED POWER HACK SAWS

### *Quality at Low Cost*

IMPROVED DESIGN — HEAVY DUTY — FAST CUTTING. A REAL SAW THAT WILL SAVE YOU TIME AND MONEY.

To start cut, relieve weight of saw frame, hold down on release lever and lower saw to work—start machine. Automatic trip stops the machine on completion of cut. Automatic relief of saw blade on the non-cutting stroke is also provided.

Capacity 6"x6" with 10" to 14" blades — Clutch Pulley 12"x3" — Speed of Pulley 120 r.p.m.



ONLY  
**\$180.15**

Motor Drive  
Arrangement  
**\$25.90**  
Additional

## L - W CHUCK CO.

20 N. ST. CLAIR ST.

TOLEDO, OHIO

made of cast iron and are dynamically balanced. The pulleys operate on dust-proof ball bearings and are properly lubricated.

The Hammond "600" Wet-N-Dri Grinder is said to include all the features of the Hammond "600" Dri plus providing wet operation for grinding, polishing, or surfacing. The floor model illustrated is equipped with a tank and pump unit. It can also be equipped for water main connection only. Both bench and floor models are equipped with damper for spray control and two nozzles for uniform spraying. Should dry op-

eration be desired at any time on either model machine, the water can be merely turned off, the drain connection re-



Hammond Improved "600" Wet-N-Dri Abrasive Belt Grinder



## M-D Facing Heads

**With Automatic Feed**

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

**MUMMERT-DIXON CO.**

120 PHILADELPHIA ST.

HANOVER, PA.

**In PRODUCTION and COMBAT alike**

**GITS OILERS** are providing one of the most essential requisites of mechanized warfare, that of positive lubrication under extreme conditions. Every lubricator in this line is designed to a specific need. The Gits Line offers a dependable answer to every lubricating problem, large or small.

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**GITS BROS. MFG. CO.**

1040 South Kilbourn Avenue • Chicago, Illinois

10 years of oil cup experience

moved, and air exhaust system attached at this point. Vacuum cup drive pulleys, which are said to eliminate belt slippage, are furnished on wet machines only.

## Challenge Special Equipment

As a result of war production requirements for pieces of special machinery and equipment for specific operations,

**Lubricated Contacts**

**Rex Rheostat Co.**  
BALDWIN, L. I., N. Y.

**WRITE FOR CATALOG**

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## Your child's best friend...

THE PARASITIC FRUIT FLY, *Drosophila*, is perhaps the most important creature in the world to scientists today. Because its study may reveal what the character of our own children may be in the future.

*Drosophila* is a perfect specimen for laboratory study, because a generation flickers past in from 8 to 12 days. As a result, scientists have been able to study and record a million breedings! And the entire mechanism of heredity has thus been revealed!

But if *Drosophila* is a friend to mankind, consider the influence of machine tools on human welfare. Do you know why it is that some countries, so rich in natural resources, still harbor hundreds of millions living close to starvation? And why the highly indus-

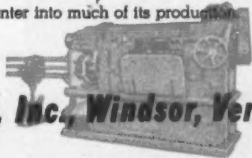
trialized countries represent the greatest advance in civilization? The answer is machine tools!

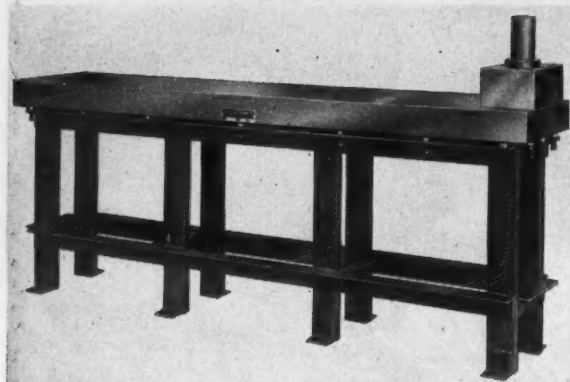
Machine tools have vastly increased the output of manufacturers and have shortened the customary hours of labor. They have not reduced the number of persons required to do the world's work. They have eliminated much of the back-breaking labor which would otherwise be required.

Cone Automatic Machine Company is proud to be a part of such an essential industry. Proud, also, to know that whatever we Americans build for the future, Cone Multiple Spindle Automatic Lathes will most certainly enter into much of its production.



**ONE Automatic Machine Company, Inc., Windsor, Vermont**





**Challenge Reading Table for  
Checking Propeller Blades**

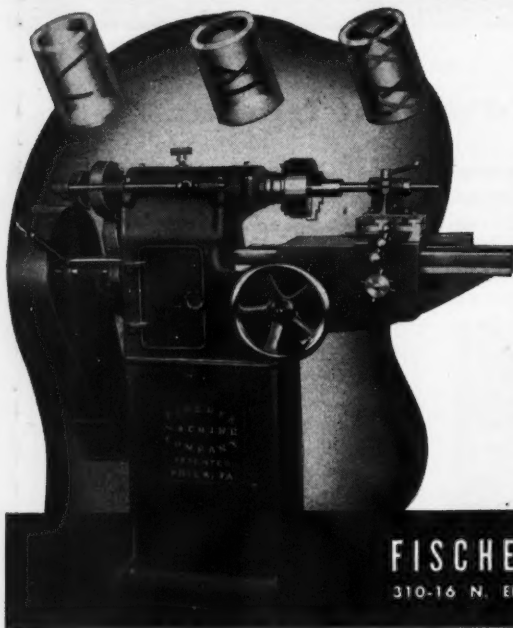
the other is mounted in a T-slot to allow for adjustment to any desired position along the table top. On special order, plates will be grooved and keyed so that two or more can be assembled into one complete unit.

### **Amic Comparator with Large Table**

The Challenge Machinery Co., Grand Haven, Mich., announces that it is now designing and building special units to customer specification. The accompanying illustration shows a reading table which has been specially designed for use in checking propeller blades.

Another Challenge development is a long layout surface plate equipped with two special V-blocks, one of which is permanently anchored to the table while

American Measuring Instruments Corp., 240 W. 40th St., New York, N. Y., announces the addition of the comparator shown herewith to its line of Amic precision measuring equipment. The indicating unit proper is mounted on an accurately machined cast iron base into which is built a parallel ground, lapped, and serrated  $6\frac{1}{2}$  x 8-inch table for use in measuring the width of piston rings, particularly airplane engine piston rings,



## **FISCHER** *Oil Groovers*

A wide variety of grooves may be cut on the "FISCHER" . . . with minimum set-up time and cost.

Bearing in which groove is to be cut is mounted on revolving chuck secured on work spindle. Boring tool is secured to carriage slide which has a reciprocating motion timed with work spindle and linked by crank gear and connecting rod.

Several attachments can be furnished for cutting practically any type of oil groove.

Capacity of No. 1 Machine—5" dia. . . . No. 2 Machine—15" dia.

**PROMPT DELIVERIES**

*Write for catalog.*

**FISCHER MACHINE CO.**

310-16 N. ELEVENTH ST.

PHILADELPHIA, PA.

Try **THIS**  
on your  
**HOT  
ROLLED  
STOCK!**



*Patented*  
**DIAMOND GRIP**  
HOLDS TIGHTER • SELF-CLEANING

Try Sutton Full-Floating Style "F" COLLETS with interchangeable, replaceable jaws—each jaw floats independently, comes to full bearing on stock—allows collet to run as true as the machine spindle. One master per machine with an assortment of jaws will handle your work, round, hex and square, up to machine capacity. Jaws are quickly changed without removing master from tube. Patented Diamond Grip takes horizontal and rotating thrusts at an angle—gives full grip with one-third less tension. With Style "F" Collets, use the companion Style "L" Feeders, with interchangeable, replaceable pads.

**SUTTON TOOL COMPANY • 2895 W. Grand Blvd. • DETROIT**

See our representative

or send for Catalog 15"

**SUTTON**



**COLLETS**



**A Warning Light  
Should Not Be  
Ignored - -**

**DUST BREATHING  
IS DANGEROUS!**

**LEIMAN BROS.  
DUST COLLECTOR**

**Individual Motor-  
Driven Units**

**For**

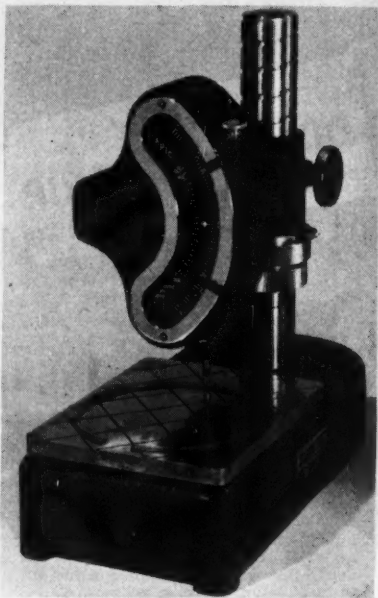
**SURFACE GRINDERS  
DOUBLE END GRINDERS  
SAWS, SANDERS, ETC.**

**LEIMAN BROS. Inc.**  
168-1 Christie St.  
Newark, N. J.

and other components of large area.

The column has a double nut adjustment, one coarse and one fine, to allow for accurate setting of the comparator by means of a master gage or gage block. For additional convenience in setting, a final adjustment of the dial is provided. Two limit hands in the form of sliders serve to indicate the range of tolerance requirements.

As in all Amic Comparators, the magnification is 1 to 1,000. A displacement of the measuring pin of 0.001 inch causes



**Amic Comparator with Large Table**

the indicating hand to move 1 inch on the 6-inch dial, which is designed to give both inch and millimeter readings. Each inch is divided into tenths, each tenth indicating 0.0001 inch. Deviations of as much as 0.00002 inch can, it is claimed, be detected with ease. Total measuring capacity is  $\pm 0.003$  inch and  $\pm 0.05$  millimeter.

A lever on the outside of the housing allows for lifting of the measuring pin before inserting the piece to be measured, thereby eliminating shocks to the mechanism of the instrument and wear on the contact pin. For special applications, accessories such as a thread measuring device, ball anvil, serrated

# SMOOTHING THE ROAD TO TOKYO!



with  
**KELLERFLEX  
MACHINES**

Every day — every night — in war plants all over the country — Kellerflex Machines are smoothing the road to Tokyo. They do a thousand and one jobs — grinding — burring — sanding and polishing in spots where flexible shaft equipment can do the job quicker and cheaper.

Shown here is the heavy-duty Kellerflex DL-6, 2 H.P. model. If you have propellers to polish — heavy steel or cast iron forgings to sand or grind — or any other heavy job where plenty of *Flexible Shaft POWER* is needed, you will find the DL-6 just the ticket.

Equipped with constant speed, 3450 R.P.M., totally enclosed, fan cooled 2 H.P. motor. Can be supplied with right angle attachment (shown above) for sanding and grinding, or straight handpiece for polishing and grinding, either  $\frac{1}{16}$ " or  $\frac{5}{8}$ " cable. Write for details.



**KELLERFLEX  
DL-6  
2 H.P.  
MACHINE**



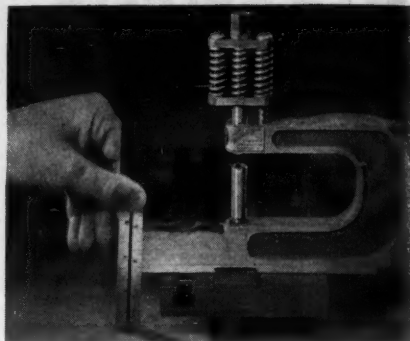
**PRATT & WHITNEY**  
Division NILES-BEMENT-POND COMPANY  
KELLERFLEX SALES DEPARTMENT  
**WEST HARTFORD, CONN.**

anvil, centering fixture, and several types of backstops can be supplied.

## Wales Type "CA" Hole Punching Unit

Marketed by the Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y., the Wales Type "CA" Hole Punching Unit illustrated herewith features a built-in adapter which permits the unit, when set up on a press brake rail, to be adjusted forward or backward  $1\frac{1}{2}$  inches for producing off-center or staggered hole patterns. With a master pattern as a guide, a series of these hole punching units can be quickly set up on a press brake rail by simply sliding the units along the rail to the proper locations, adjusting forward or backward as necessary, and locking in position.

Completely self-contained, the Wales Type CA Hole Punching Unit has nothing to attach to the ram of the press. The punch and die are held in accurate alignment by the body of the unit and are instantly removable. A three-spring "Selective Stripper" provides ample stripping pressure to strip any metal



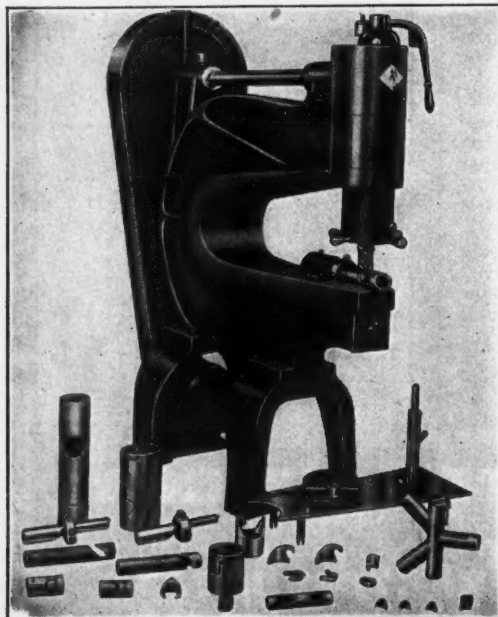
Wales Type "CA" Hole Punching Unit

the punch will penetrate.

The Wales Type CA Hole Punching Unit is available in sizes for punching holes up to  $\frac{1}{8}$  inch in diameter.

## "Rotab"

Designed to provide a means for quickly and easily machining and measuring large objects such as fixtures, castings,



For **FAST** and **SAFE** cutting of sheet metal, duplicating parts, and to relieve other machine tools, investigate the

## SAVAGE NIBBLING MACHINE

**TUBE SLOTTING AND TUBE SHAPING**  
For cutting flat sheets by template or to a scribed line.

**Cutting Capacities**  
Flat Sheets Mild Steel  $\frac{3}{4}$ "  
Tough Alloys  $\frac{1}{2}$ "

**Tubing**  
Wall thickness to  $\frac{1}{8}$ "  
1" I.D. to 36" O.D.

The Fastest Method of Tube Slotting and Shaping by Guide Template.

Ask for BULLETIN "H"

Manufactured by

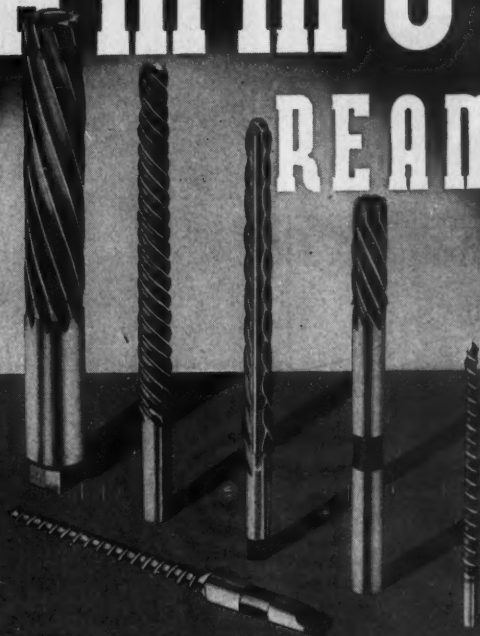
**W. J. SAVAGE COMPANY**

Since 1885

**KNOXVILLE TENNESSEE**  
Pioneer Manufacturers of Nibbling Machines

# GAMMONS

## REAMERS



*Manufacturers of*

*The Gammons Helical Taper Pin Reamer*

*The Gammons Helical Chucking Reamer*

*The Gammons Helical Die Makers Reamer*

*The Gammons Duplex Taper Pin Reamer*

*Special reaming problems invited*

*Send for Catalog*

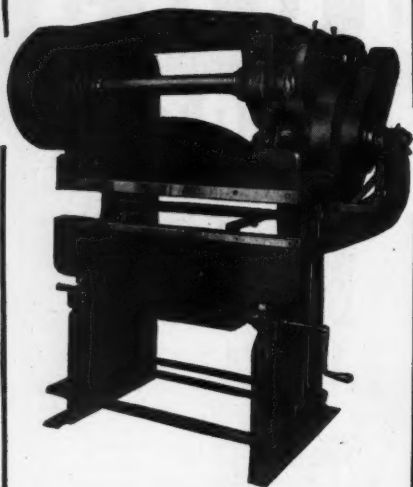
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# CHICAGO STEEL PRESS

No. 253



## SPEED WAR PRODUCTION OF SHEET METAL WORK

USE FOR...

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2. EMBOSSING
3. MULTIPLE PIERCING
4. NOTCHING
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Bomb Fins, Aircraft Parts and Many  
Other Offense Products.

The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

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**DREIS & KRUMP MFG.  
Company**

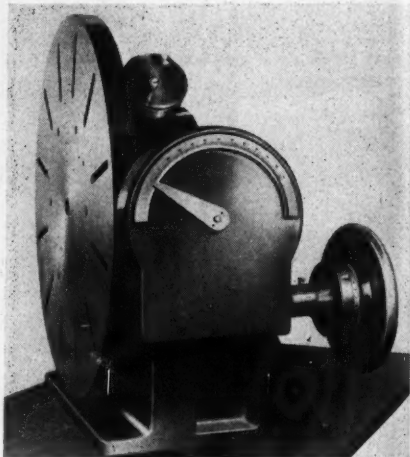
7418 LOOMIS BLVD.

CHICAGO

ILLINOIS

patterns, or fabricated parts, the "Rotab" pictured herewith has been introduced by Machine Products Corp., 6773 E. McNichols Rd., Detroit, Mich. The unit includes a 36-inch circular table on which the work to be measured may be clamped. According to the manufacturer, all angles on the work can be measured without disturbing the original clamping.

By means of geared turning wheels, the table can be rotated to any degree and to any angle from a vertical to a horizontal position and then 30 deg. be-



"Rotab"

low in the opposite direction. Dials with degree and minute graduations indicate the angle of setting. A 10-inch sine bar is provided for use in cases where greater accuracy is required. After the table is set, it may be firmly locked in a fixed position—radial or angular. It may also be disengaged for rotating freely by hand. An auxiliary table 18 $\frac{1}{2}$  inches in diameter is available for use with the unit in place of the 36-inch plate for handling smaller work.

In addition to its function as a measuring device, the Rotab can be used as a holding fixture for boring mill setups. By reason of the ability of the unit to assume any angle, work clamped to the Rotab can be made to approach the cutting tool on a mill without presenting any difficulty in locating the proper place for processing.

The overall height of the Rotab with table in horizontal position is 27 $\frac{1}{2}$  inches.

# Longer Service from Your **CURTIS** **AIR HOISTS** and **CYLINDERS**



★ Follow these maintenance tips, and you'll get the longest possible service from your Curtis air-powered equipment:

- ✓ 1. When running a new air supply line, or relocating an old one, be sure to blow out all grit, rust, and chips before connecting to the hoist.
- ✓ 2. Do not install hoists close to an open furnace or other source of heat without shielding.
- ✓ 3. Put one-half pint of heavy cylinder oil into the cylinder through the oil plug in rear head every 30 days.
- ✓ 4. If piston jumps or jerks, it indicates improper oiling or binding of rod stuffing box. Keep stuffing box leak-tight only.
- ✓ 5. Fill oil cup on valve every 30 days.
- ✓ 6. Drain off any condensation in cylinder periodically.
- ✓ 7. Check valve disc and seat occasionally to prevent wear from grit or dirt in air line. A worn valve causes "creeping" and loss of efficiency.

**CONSERVE METALS—BUY WAR BONDS**

**CURTIS PNEUMATIC MACHINERY DIVISION**  
of Curtis Manufacturing Company  
1913 Kienlen Avenue • St. Louis, Missouri

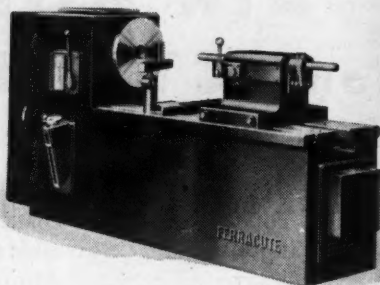
The base measures  $20\frac{1}{2}$  x  $27\frac{1}{8}$  inches, and the weight of the unit is 1,400 lb.

## Ferracut Model 224 Spinning Lathe

Spinning, buffing, burnishing, trimming, wiring, beading, and other operations can be rapidly performed through the use of the Ferracut Model No. 224 Spinning Lathe shown herewith, product of the Ferracut Machine Co.,

Bridgeton, N. J. The box frame of the lathe is of heavy and rugged cast iron construction to provide the necessary rigidity for rotating work at high speed.

The machine is powered by a 5 h.p. motor having two speeds—high and low—which are selected through push buttons on control panel. By rotating a



Ferracut Model No. 224 Spinning Lathe

## ACCURATE SPACING...

assured on all indexed work on a Universal Milling Machine. Straight, spiral or tapered. No binding, cramping or lost motion.



No. 130

RED-E Compensating  
Milling Machine Dog  
CATALOG 43

**THE READY  
TOOL CO.**

510 Ironston  
Ave.  
Bridgeport  
Conn.

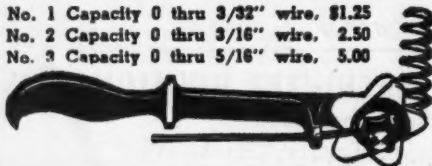
handwheel conveniently located at the left side of the machine, the low motor speed can be infinitely varied between 200 and 500 r.p.m. and the high motor speed, between 400 and 1,000 r.p.m. A higher motor speed range is also available if desired. Motor speed is indicated by a graduated gage and may be varied while the lathe is in operation.

The motor is enclosed in a ventilated compartment. The motor starter, which is designed to provide protection against overheating of motor windings, is built-in.

The Ferracut Model No. 224 Spinning Lathe is equipped with an air-operated tailstock spindle, movement of which forward and backward is controlled by a single lever that also serves to lock

## Here's a Real Spring Winder!

- No. 1 Capacity 0 thru  $3/32$ " wire, \$1.25
- No. 2 Capacity 0 thru  $3/16$ " wire, 2.50
- No. 3 Capacity 0 thru  $5/16$ " wire, 5.00



**WILL EARN ITS COST IN ONE DAY**  
The **HJORTH** Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

**HJORTH LATHE & TOOL CO. 12 BEACON STREET WOBURN . MASS.**

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**ONLY ONE WAY**  
to correctly tension  
a stud or bolt!

And that way is to *know* the tension... accurately... as the nut is tightened. In many operations "guesswork" tightening can cause endless trouble. Snap-on

Torquemeters make precision tensioning as simple as reading a dial. Their use insures predetermined accuracy on

fine assembly work, and prevents mechanical distortion in cylinder heads, bearings, steam flanges and transmission systems. As easy to use as an ordinary wrench.

Snap-on Torquemeters are available in a wide range of capacities, from 150 in. lbs., to 2,000 ft. lbs. Full information available on request. Write —

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8032-H 28th Avenue Kenosha, Wisconsin

**Snap-on Tools**  
THE CHOICE OF BETTER MECHANICS

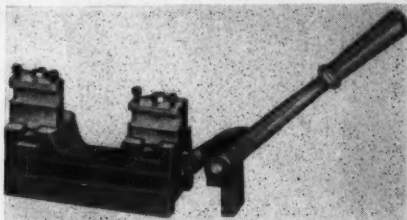
the spindle in desired position. The spindle has a maximum travel of 12 inches, and the length of travel can be set at any amount within this range. Speed of positioning the spindle is readily adjusted by means of a control valve. The spindle is hollow and has a No. 3 Morse taper. The casting in which the spindle is mounted can be easily moved and firmly clamped at any desired position on the lathe bed.

The headstock of the machine is equipped with a hollow spindle having a standard No. 3 Morse taper for inserting center, drills, or other tools. A faceplate is keyed to the spindle and held in place by a spanner nut, an arrangement which is said to allow for quick removal of the faceplate when desired yet assures the rigid locking of spindle and faceplate together while work is being done. Both the headstock and tailstock spindle assemblies are equipped with Timken bearings and can be lubricated by a pressure grease gun through accessible, standard fittings.

Specifications of the Model No. 224 Spinning Lathe are as follows: maximum distance between centers, 48 inches; maximum swing over bed, 24 inches; headstock spindle bore,  $\frac{5}{8}$  inch; tailstock spindle bore,  $\frac{3}{4}$  inch; motor, 220-440 volt, 60 cycle, 3 phase, 5 horsepower.

## Kessler Aero Lever-Operated Cross Slide

A lever-operated cross slide for use in performing both forming and cut-off work in a single operation has been added



Kessler Aero Lever-Operated Cross Slide

to the line of lathe tool attachments manufactured by Kessler Aero Products Co., 211 W. Palm Ave., Burbank, Cal. Designed for easy adaption to Atlas, Logan, 9-inch South Bend, Craftsman, and similar lathes, this double tool post device is machined so as to fit the dovetail on the lathe carriage and can be operated without disturbing tool or carriage positions.

*"Accuracy with promptness"*

W. S. **DE MOSS** AND SON

WILBUR L. HIATT

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★ **FIXTURES**  
★ **GAGES**  
★ **TOOLS**

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**DIES**

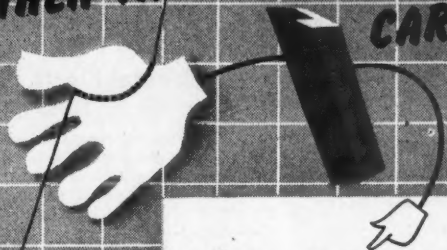
DeMOSS — recognized specialists in the design and construction of DIES.

CUSTOM BUILDERS OF  
FIXTURES  
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TOOLS

**P**RACTICAL DESIGN  
PRECISION WORK  
PROMPT DELIVERY

AT YOUR SERVICE!!

# LENGTHEN THE "LIFE-LINE" OF YOUR CARBIDE TOOLS



## Follow These Simple Pointers

- ① Re-sharpen carbide tools frequently. Never permit them to become dull.
- ② Maintain proper wheel speeds,
- ③ Use moderate pressure and medium feed.
- ④ Keep machine and tool holder rigid and free from vibration.
- ⑤ If a loose spindle cannot be remedied use a harder grade of wheel.
- ⑥ If grinding wet use an adequate supply of the proper coolant.
- ⑦ If grinding dry do not over-heat the carbide tip
- ⑧ Never cool a carbide tip by immersing it in water or other coolant.

⑨ **USE MID-WEST "B" BOND WHEELS FOR ALL CARBIDE TOOL GRINDING.**



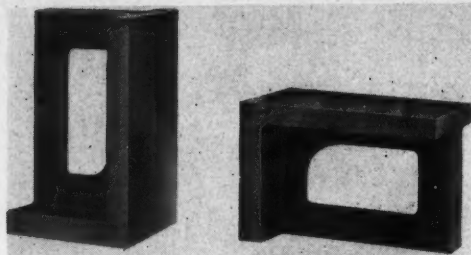
MID-WEST engineers will be glad to help you select exactly the right "B" Bond wheels for your grinding room. MID-WEST "B" Bond wheels are manufactured in any grain and any grade, porous or dense. Reasonably prompt delivery

## MID-WEST ABRASIVE COMPANY

Manufacturers of **DEPENDABLE** Abrasives

1960 E. Milwaukee Ave.

Detroit 11, Mich.



Challenge Universal Right Angle Irons

### Challenge Universal Right Angle Irons

Designed for use wherever square reference surfaces are needed, the Challenge Universal Right Angle Irons shown herewith are now being offered by The Challenge Machinery Co., Grand Haven, Mich. The blocks may be placed in practically any position with work clamped to the surfaces for measuring. They may be also used as height blocks for measuring large work. A convenient hand grip for moving is provided by

an opening in the rib of each block. The Challenge Universal Right Angle Irons are made of special analysis, fine semi-steel that is specially heat treated. Ends and sides are precision ground square and true.

### General Electric Electronic Heaters

A line of electronic heaters for the high-frequency induction heating of metal parts for brazing, soldering, and selective heat treating is announced by the Industrial Heating Division of the General Electric Co., Schenectady, N. Y. Essentially power oscillators which convert 60-cycle power to high-frequency power at approximately 500,000 cycles, the electronic heaters are available in two standard sizes—one having an output of 5 kw. and the other 15 kw.

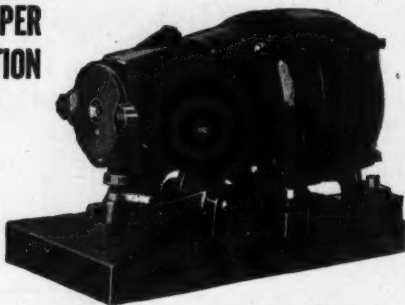
Simple circuits are employed and the necessary electronic tubes, controls, and other equipment are arranged in compact, completely enclosed cabinets. The use of conservatively rated elements reduces maintenance to the periodical re-

### THE PERFECTION WIRE STRIPPER WILL SPEED UP YOUR PRODUCTION IMMEDIATELY!

- RAPID
- PRECISE
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- BUILT TO ENDURE
- SIMPLE TO OPERATE

THE PERFECTION WIRE STRIPPER puts wire stripping on a production basis—Instantly and completely it removes the insulation from the ends of solid, stranded or multi-conductor cable or wire, up to one half inch in diameter.

THE PERFECTION WIRE STRIPPER is a precision equipment—ruggedly built and engineered to provide years of trouble-free operation. Send now for descriptive literature on this versatile and essential instrument.



PATENTED MODEL A

**WEBER MACHINE CORPORATION**

59 RUTTER STREET  
ROCHESTER, N. Y.

# A Full Range SENSITIVE DRILLING MACHINE

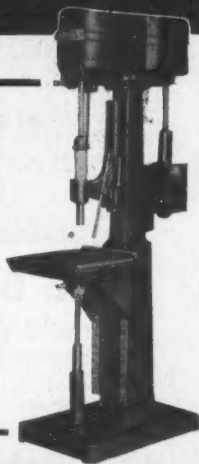


• The choice of fine machine tools now will help you meet those new production schedules needed to win the war. • Footburt sensitives are built with the wide range of speeds and with the power and sturdiness to drive cutting tools to their full capacity. They are built with the care and precision that will keep them accurate over a long period. • Write, wire or phone for prices and delivery information.

**THE FOOTE-BURT COMPANY • Cleveland, Ohio**  
Detroit Office: General Motors Building

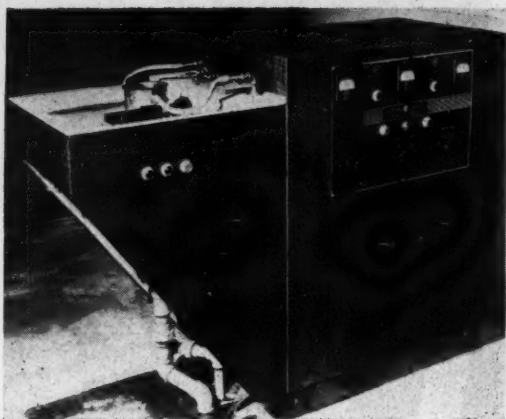
## No. 2 MACHINE WITH BACK GEAR

8" or 12" Overhang •  $\frac{7}{8}$ " Drilling Capacity in Steel  
• Optional Speed Ranges • 185 to 2300 R.P.M. • 280 to 3450 R. P. M. • Vertical Motor Drive with Standard Single Speed Motor • PowerFeed Assembly • Tapping Attachment • Coolant Outfit



# FOOTBURT

*Sensitive*  
DRILLING MACHINES



General Electric 5-Kw. Electronic Heater

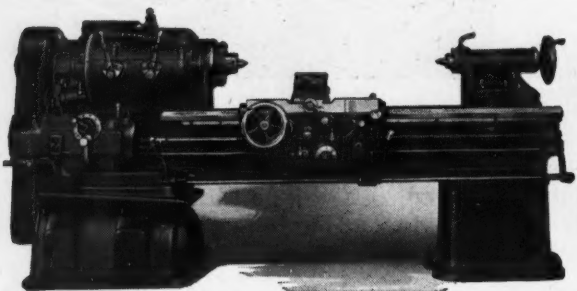
depending upon the work to be done.

Operation of the equipment is simple. With the inductor coil connected to the terminals of the oscillator and the timer set, the filament switch is turned on and, if necessary, the filament voltage is adjusted. Next, the predetermined transformer tap on the dial switch is selected and the grid rheostat set. The operator then turns the selector switch for automatic operation and repeats heat after heat merely by locating the piece in the inductor coil and initiating the automatic cycle by operating a push button.

placement of tubes, which, when properly installed, are said to have an average life of 5,000 to 10,000 hours or more.

Attached to each electronic heater is a suitable work table, with the necessary water-cooled coil or coils connected to the heater terminals. The coils can be easily fabricated in different shapes,

The oscillator circuit used on both 5 and 15-kw. electronic heaters is said to require a minimum of adjustment or tuning. The line voltage is stepped up by a power transformer and rectified to direct current. The direct current supplies the oscillator circuit, which consists of grid-controlled vacuum tubes shunted across a parallel resonant cir-



## Engine Lathes

### THE BOYE & EMMES MACHINE TOOL CO.

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CINCINNATI.....Pratt & Whitney Co.  
CLEVELAND.....Pratt & Whitney Co.  
DETROIT.....D. E. Morand Machinery Co.  
DULUTH.....W. P. & R. S. Mars Co.  
GRAND RAPIDS.....Joseph Monahan  
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## THE NO. 50 CROSS

A Universal Gear Chamfering Machine for producing any form on internal and external gear teeth with a "pencil-point" cutter. Spur, helical, herringbone or, gears with relieved teeth are all chamfered with equal ease. Can be tooled economically for quick set-up and automatic operation.

*Literature upon Request.*

# CROSS GEAR & MACHINE CO.

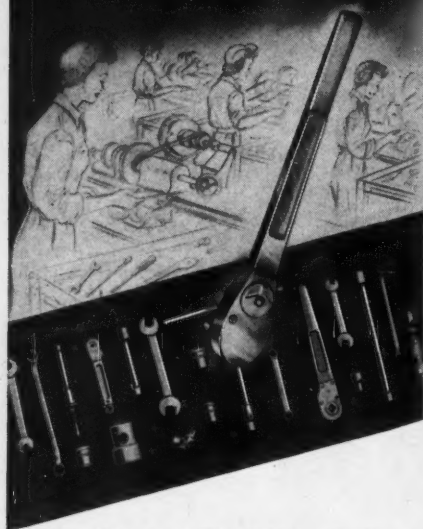
*Established in 1898.*

DETROIT MICHIGAN U.S.A.

500



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**New Workers Need New Tools**  
Modern in design — strong-  
light — durable. Walden-  
Worcester in its long years  
of experience has always  
been a leader in making  
hard jobs easier by engineer-  
ing its tools on the draft-  
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on the workbench. Don't  
buy heavy, clumsy tools when  
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Tools are available.

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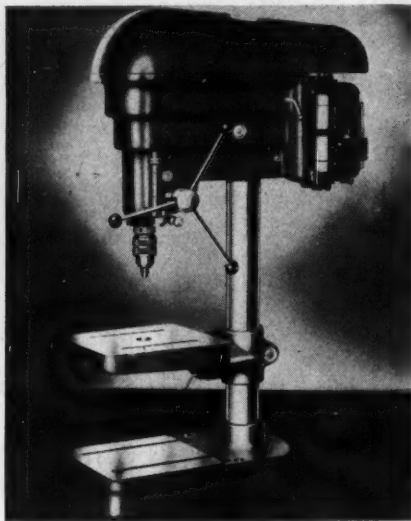
WORCESTER, MASSACHUSETTS, U. S. A.



cuit. The tube functions like a rapidly operating switch at the fundamental frequency of the resonant circuit. The heater coil is connected in series with the parallel resonant inductance by means of convenient connectors, taps being provided to give flexibility in obtaining maximum efficiency for various heater coils. A timer in the oscillator permits the automatic timing of heating cycles.

## Boice-Crane No. 2600 "Helmet Head" Drill Press

Offered in over 60 models, a drill press which is said to be perfectly balanced and vibrationless in operation, to be known as the No. 2600 "Helmet Head,"



Boice-Crane No. 2600 "Helmet Head" Drill Press

has been brought out by the Boice-Crane Co., 937 Central Ave., Toledo, Ohio. The unit is available in one, two, three, and four-spindle types, high and slow speed, for use on either bench or floor; and with slotted or trough table. Five carefully predetermined speeds allow for use of press in performing a wide variety of drilling operations.

A feature of the Boice-Crane No. 2600 Helmet Head Drill Press is a self-cen-

War Will End...

**BUT PRECISION -  
NEVER!**



Some day—we don't know just when, but we know it's coming—sirens and whistles will let go with full-throated blasts, throngs will fill the streets of every crossroads village and metropolis in America and newsboys will hawk their papers blazoned with a single word — PEACE!

For most Americans, Victory will mean a return to the free and easy pre-war ways. But not on the efficiency front. There'll be no let-up in the WELCO precision engineering which signifies DEPENDABILITY on a score or more of fighting fronts today.

For WELCO Torque Motors, providing power on the spot where power is needed, will be doing the job for a world at peace just as they are doing it today for the fighting Allies.

**THE B. A. WESCHE ELECTRIC CO.**  
1626 VINE ST. CINCINNATI, OHIO



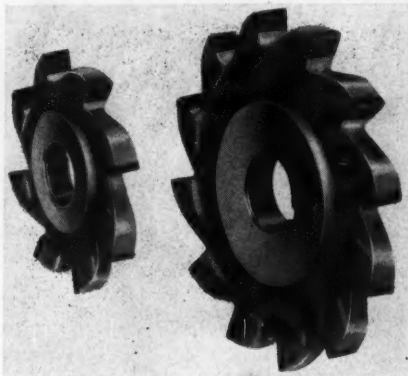
tering 30-deg. pressure angle six-tooth involute spline. The spindle, quill, and spindle pulley of the machine are said to be held in permanent, perfect alignment. The quill, which is unusually long and large in diameter, is supported by means of three bearings, thus permitting long holes to be drilled with utmost accuracy.

The Boice-Crane No. 2600 Drill Press is available with two sizes of tapping heads for use in performing light tapping operations. When equipped for tapping, the machine operates at a speed of 3,000 r.p.m. when feeding the tap

into the hole and at 6,000 r.p.m. when withdrawing the tap. Taps are said to enter holes centrally without the slightest strain.

### Super Carbide-Tipped Milling Cutter

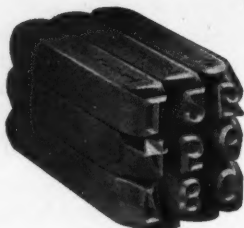
A carbide-tipped milling cutter with cast alloy body, use of which is said to greatly increase the production of vari-



Super Carbide-Tipped Milling Cutters

ous types of parts, including extremely hard workpieces, has been developed by the Super Tool Co., 21640 Hoover Rd., Detroit, Mich. According to the manufacturer, the unusually high speeds at which the cutter can be operated leads to increased table feeds, and at these fast speeds, it is said that finishes obtained on workpieces are comparable to ground surfaces. Great accuracy of cutting is also claimed at these high

## THOR STAMPS



**T** is for the **TOUGH** alloy steel used to make them.  
**H** is for their **HARDNESS** — scientifically correct.  
**O** is for the **OLD AGE** which Thor Stamps reach in use.  
**R** is for the **ROUGH** treatment they take.

Send for samples—today.

**The Pittsburgh Stamp Co.**

812 CANAL ST. • PITTSBURGH, PA.

## EVANS HIGH SPEED STEEL REAMERS



### LOOK AT THESE FEATURES

- No honing.
- Perfect alignment.
- 50 to 80 thousandths expansion.
- Will not chatter.
- Full bearing surface.
- Cannot fall in slots or oil grooves.
- Chrome-like finish.
- Left and right spirals.
- Extension pilots for line-up-work.

**EVANS REAMER AND MACHINE CO.**

4541 RAVENSWOOD AVE.

CHICAGO, ILL.

WRITE FOR  
CIRCULAR



## IN WORLD WAR II AS IN WORLD WAR I **BUCKEYE BEARINGS**

***Speed production — and meet fully the requirements of  
grueling round-the-clock operation***

● Reflecting in every detail the advantage of our rigid inspection and exacting laboratory and metallurgical control of melting and pouring temperatures, Buckeye Bearings give a maximum of efficient satisfactory service. Buckeye Bearings are accurately dimensioned within the required limits, assuring speedy, easy assembly, —and are free from porosity or blow holes. Each piece, month after month, measures up fully to Buckeye's exacting specifications.

For airplanes, tanks, combat cars, pumps and all the behind-the-line production machinery, standardize on Buckeye Bearings. They are available fully finished in 1088 ready-to-use stock sizes—in several graphited styles—in cored and solid 13" bars,—and in any OD, ID and length, slotted, split, drilled or threaded exactly to customer's blue-print. No order is too big or too small for Buckeye. Let us quote on your requirements.

# *Buckeye*

## **BRASS AND MANUFACTURING COMPANY**

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BRONZESMITHS

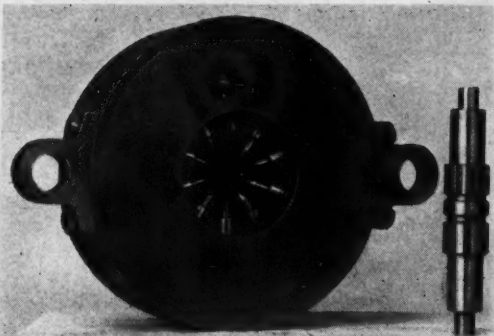
SINCE 1900

CLEVELAND, OHIO



**BRONZE SLEEVE BEARINGS • STANDARD SIZES OR TO CUSTOMERS' BLUEPRINT  
IN ANY RECOGNIZED BEARING METAL ANALYSIS**

View of "Universal" High Speed Multiple Cutter Milling and Splining Head Showing Arrangement of Cutting Tools for Machining Workpiece at Right



operating speeds. The feed per tooth being low, the cutting pressure is reduced and there is consequently less distortion of the work.

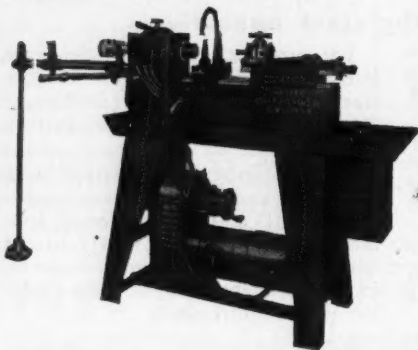
Another advantage claimed is the throwing off of the major portion of the heat in the chip, leaving less to be absorbed by the work and the cutter. According to the manufacturer, many of these cutters are now being successfully used on steel at surface speeds of 400 to 600 feet per minute, with tooth loads varying from 0.0005 to 0.0025 inch, depending upon the hardness of the steel.

Standard cutter for machining cast iron, brass, bronze, copper, aluminum, magnesium, and plastic is available in diameters from 3 to 8 inches in a variety of widths and with either four or six flutes. For cutting steel, the tool is made with six to 16 flutes, according to the diameter.

### "Universal" High Speed Multiple Cutter Milling and Splining Head

The "Universal" High Speed Multiple Cutter Milling and Splining Head illustrated herewith, product of Earle G. Boyer, 6944 Cresheim Rd., Philadelphia, Pa., is designed for milling multiple splines, grooves, or slots of all types in drive shafts, propeller shafts, and miscellaneous items requiring such machining. Various types or shapes of multiple

## STEVENS



### Screw Machines

Built in two sizes with Stepless Speed Variations up to 2400 revolutions. Motor driven with convenient electric controls for efficient operation. Other salient features are

- SIMPLE AND DURABLE CONSTRUCTION
- MEANS FOR RE-ALIGNING TURRETS
- EASE IN OPERATING
- MOTOR-DRIVEN COOLANT PUMP
- LARGE CHIP AND OIL CAPACITY
- MAGNETIC BRAKE
- ALL PARTS ACCESSIBLE
- SAFETY

Write for illustrated circular

## JOHN B. STEVENS INC.

482 CANAL STREET

NEW YORK 13, N. Y.

Builders of dependable machinery for 35 years.

MIDWEST

# Core Drills

FOR  
ENLARGING  
DRILLED, PUNCHED  
FORGED OR CORED  
HOLES



**SAVES VITAL  
HIGH SPEED  
STEEL**

## HIGH SPEED DRILL TIP

STYLE NO. 410

Sizes:  $\frac{1}{8}$ " to 3"



## PLAIN CORE DRILL HOLDER

STYLE NO. 1410

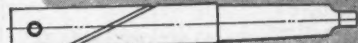
Recommended for relatively shallow work with drill tips  $\frac{1}{8}$ " to  $1\frac{1}{2}$ " dia.



## PILOT BEARING CORE DRILL HOLDER

STYLE NO. 1415

Designed for operation through jig bushings with drill tips 1" to  $1\frac{1}{2}$ " dia.



## FLUTED CORE DRILL HOLDER

STYLE NO. 1420

Recommended for deep hole work with drill tips  $1\frac{1}{2}$ " to 3" dia.



**M**IDWEST DRILL TIPS are made from selected high speed steel; Midwest Holders are made from tough alloy steel. This combination of Tip and Holder saves vital steel by taking the place of solid high speed core drills which are costly and often quickly go undersize. Midwest Tips can be ground many times before replacement is necessary and when worn out a new one can be inserted in the original holder without removing the holder from the machine.

These core drills and holders are provided with the rigid and accurate Midwest Taper and Pin Drive, and the combined Tip and Holder has all the advantages of a solid steel drill.

Midwest Core Drills are furnished to fit plain, piloted type or fluted type holders as illustrated above. Further information on Midwest Core Drills and other Precision Metal Cutting Tools is contained in Midwest Catalog 17

**MIDWEST TOOL & MFG. CO.**  
2366 W. JEFFERSON AVENUE, DETROIT 16, MICHIGAN

**MIDWEST**

Engineers and Manufacturers of Precision Metal Cutting Tools which contribute to the progress, prosperity and comfort of mankind

MILLING CUTTERS • SLEEVES • COUNTER BORES • END MILLS • REAMERS • SPECIAL TOOLS • FORM TOOLS • CARBIDE TIPPED TOOLS • ADJUSTABLE HOLDERS

**ANOTHER EXAMPLE OF JOB TESTED MIDWEST TAPER AND PIN DRIVE**

## IMPROVED BALANCING WAYS



Four chilled iron discs rotate on special sensitive bearings. For balancing, straightening and trueing. Write for details.

|                                     |       |       |       |       |        |
|-------------------------------------|-------|-------|-------|-------|--------|
| Swing                               | 20"   | 40"   | 60"   | 72"   | 96"    |
| Greatest Distance Between Standards | 20"   | 30"   | 30"   | 66"   | 88"    |
| Capacity in lbs.                    | 1,000 | 2,000 | 2,000 | 5,000 | 10,000 |

**ANDERSON BROS. MFG. CO.**

1926 Kishwaukee St.

Rockford, Ill.



**Save Time on WAR ORDERS**  
with a  
**BEVERLY Throatless SHEAR**

If you're cutting straights or irregulars on "War" jobs, you can speed 'em up with a BEVERLY. Write for sizes and prices now!

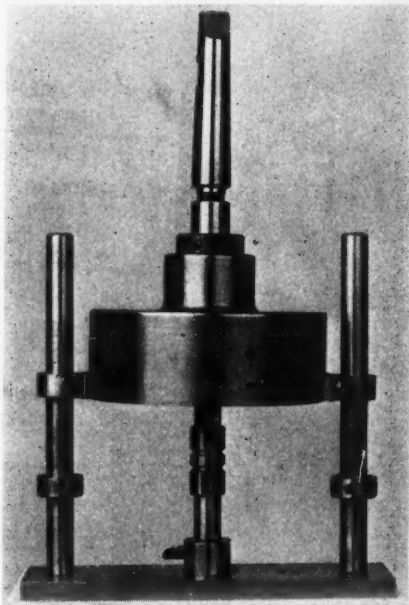
**BEVERLY SHEAR COMPANY**

3004 W. 111th St.

Chicago, Ill.

splines or grooves may be efficiently milled by merely changing the cutting tools, which may be adjusted to accurate micrometer settings from the outside while the head is in operation. Machined parts requiring a square or hexagon end milled on same can be handled to advantage on a production basis by changing the position of the cutter holders and cutters to meet requirements.

The Universal Multiple Cutter Milling



"Universal" High Speed Multiple Cutter Milling and Splining Head

and Splining Head shown herewith has a capacity for all types of work from  $\frac{3}{4}$  to 2 inches in diameter inclusive. Larger heads having capacities for work up to 5 inches in diameter can also be obtained. The design of the head enables it to be readily used in any ordinary drill press or engine lathe. The head can be operated in either forward or reverse direction, longitudinal or vertical position or at any angle or degree between same. Splines or grooves can be milled either straight or spiral in either direction at either a maximum or minimum pitch. All internal operating parts of the head are mounted on Timken roller bearings which are en-



Your grinding problems can be minimized by using the proper **DIAMOND EMERY WHEEL DRESSER**. Make sure that you are using the right **DIAMOND TOOLS** in all grinding departments, especially when performing the more difficult jobs, such as Form-Grinding, Thread and Gage Grinding.

Let us know what your particular problem is so that we may supply you with the correct **DIAMOND TOOLS**. Our large stock permits immediate delivery on all types of **DIAMOND EMERY WHEEL DRESSERS**.

**F. F. GILMORE & CO.**

**285 COLUMBUS AVE. BOSTON, MASS.**

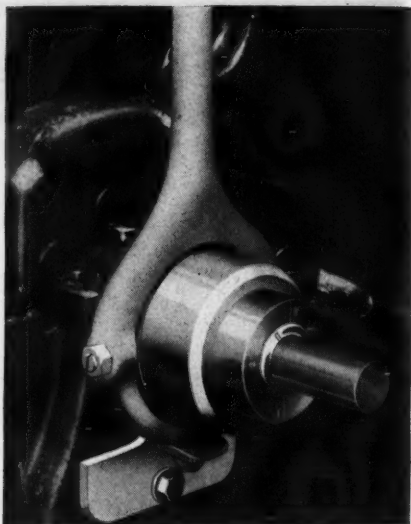
**DIAMOND IMPORTERS AND TOOLMAKERS**



closed and fully protected in an oiltight, dirt and grit-proof reservoir of high grade lubricant.

### Hall Collet Chuck

A collet chuck of unusually simple design is now being introduced by the Hall Mfg. Co., 622 Tularosa Drive, Los Angeles 26, Cal. The chuck is available in two standard models; namely, Model A for all lathes with  $1\frac{1}{2}$  inch-8 thread spindles, and Model B for all lathes with



Hall Collet Chuck

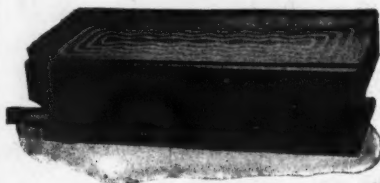


#### SAVES YOU TIME — MONEY — SPACE

Saves time because all stock is in view. No looking around. Saves money because original cost is low. Saves space because very little required. 4 arm, 51" high, stacks 10,000 lbs. flat or round stock; 5 arms, 57" high, 12,000 lbs. tubing less weight—3 stands for 20' lengths or 2 for 12' or shorter. Use against wall or back to back in center of room. Small cost—big value. Priority Regulations govern delivery.

**WM. S. YOHE SUPPLY CO.**  
505 Gibbs Ave. N. E., Canton, O.

### D & W MAGNETIC CHUCKS



Standardize on D & W Chucks. It is designed to give maximum holding surface with strong and uniform pull. Special demagnetizing switch supplied with each chuck, for readily releasing work.

*Send for folder covering chucks  
and demagnetizers*

**J & H ELECTRIC CO.**  
202 Richmond St. Providence, R. I.

$1\frac{1}{2}$ -inch spindles. Chucks for larger sizes of spindles are available on special order.

The chuck can be locked to and unlocked from the lathe spindle without stopping the lathe by means of an arm, the design of which is such as to hold the chuck in powerful grip to the spindle yet to allow for easy locking and unlocking by women operators.

The Hall Collet Chuck is of a "push-out" type, pushing the stock against the stop so that length accuracy is easily obtained. The chuck is said to provide for maximum rigidity when installed, extending only 2 inches beyond the spindle, and is designed to eliminate the

### "ALNOR" Velometer



**An All Purpose Air  
Velocity Meter—  
Instantaneous,  
Direct Reading.**

Measures total and  
static pressures as  
well as velocities.

Write for catalog.

**ILLINOIS Testing  
Laboratories, Inc.**  
153 W. Austin,  
Chicago

from the desk of J. W. KING  
PURCHASING AGENT

12:30—Ed: when you get back,  
look these over—I think Armour  
has the answer to our abrasive problem  
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**ARMOUR'S ELECTROCOATED  
ALUNDUM CLOTH**

comes in 50-yard  
economy rolls, to  
end lost time be-  
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**ARMOUR'S FIBRE  
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help speed up die  
casting seam re-  
moval, beveling  
and finishing.



**ARMOUR'S ALUNDUM  
CLOTH SHEETS.**

Comes in 9 x 11-  
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precision hand fin-  
ishing of metalsur-  
faces.



**ARMOUR'S ALUNDUM CLOTH  
SPIRAL WOUND BANDS**

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grits for any size  
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chances are there's an Armour Abrasive  
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For the Armour Sandpaper Works  
are specialists in abrasives to meet to-  
day's industrial needs... large or small.

From the most minute clean-up  
operation to the biggest finishing job,

there's an Armour Abrasive designed  
to do the job cleaner, faster, better.

The four Armour Abrasives shown  
here are just a sample. We'd like to  
show you the rest of the Armour  
Abrasive line, with special reference to  
helping you speed up today's produc-  
tion. Call us in. No obligation.

## ARMOUR SANDPAPER WORKS

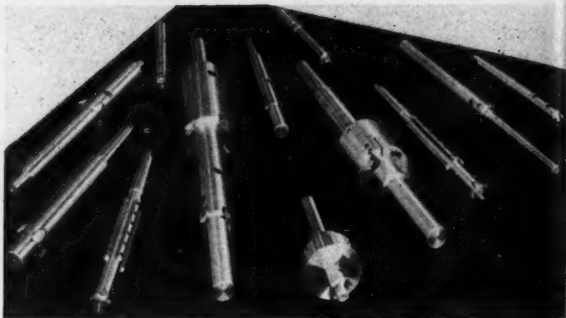
Division of Armour and Company

1355 WEST 31ST STREET • CHICAGO, ILLINOIS

### State Multiple Cutter Adjustable Boring and Reaming Bars

need for thrust bearings. Automatic adjustment of the pressure on the collet permits bar stock of various diameters to be firmly held.

Accurate mounting of the Hall Collet Chuck is obtained by means of an adapter that is faced true on the lathe spindle on which it is to operate. Installation of the chuck on any lathe is quickly effected since only the fulcrum of the locking arm need be bolted to the lathe.

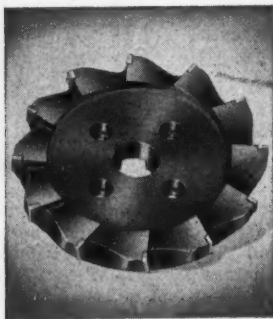


### State Multiple Cutter Adjustable Boring and Reaming Bars

A line of multiple cutter adjustable boring and reaming bars now being marketed by the State Mfg. & Construction Co., Franklin, Ohio, can be readily

adapted to a wide variety of work in industrial plants, including the production of bombs and shells where, by attaching collars containing facing and chamfering tools, three operations can be performed at one time.

The accompanying picture shows a groups of both standard and special State Bars and illustrates clearly the many diversified adaptations that are possible. Bars with pilots, wear strips, and collars are shown as well as a duplex bar with two sets of multiple cutters for boring two different diameters.



Hyper-mill "Cal-Cutter" with negative rake for machining steel

# NEW!

STANDARD and SPECIAL CARBIDE TIPPED

## Cal-Cutters

FOR HIGH PRODUCTION MILLING!

Specially designed with suitable rake and helix angles for high production milling of steel, cast iron, aluminum, bronze, etc. Standard types of Cal-Cutters with negative or positive rake angles include: Staggered tooth mills, end mills, shell end mills, face mills, hyper mills, heavy duty face mills, adjustable bore-face mills, half side mills, adjustable face and step mills, slitting saws, etc. Special cutters (not listed) made on order.

Write for new catalog M-1—no obligation!



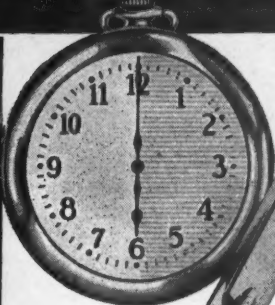
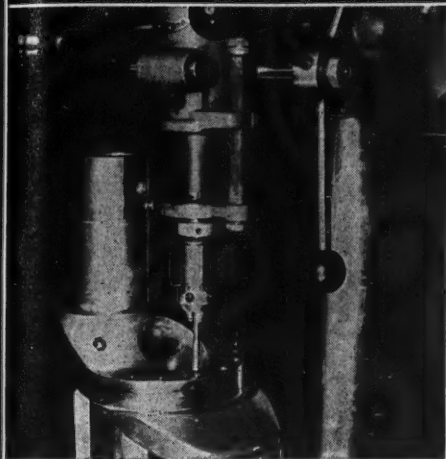
**MACHINERY MANUFACTURING COMPANY**

1913 EAST 51 ST., VERNON LOS ANGELES, CALIFORNIA

*Vernon Line of*

**HORIZONTAL MILLS, VERTICAL MILLS and JIG BORERS, SHAPERS and GRINDERS**

# "HARDSTEEL" DRILLS



*Save  
6 Hours Time*

## ... Removing Broken Tap from Wright Crankshaft!

In the plant of one manufacturer of Wright crankshafts, "HARD-STEEL" drills are saving time and giving 100% parts recovery when taps break in blind holes.

### FORMER PRACTICE

Grinding out tap with pencil grinder — time 8 to 8½ hours — frequent loss of the part when grinder defaced threads.

### PRESENT PRACTICE

Drill about ⅛ inch into tap with a "HARD-STEEL" drill—enlarge hole by grinding—drill again—grind and continue until tap is cut out. Time 2 to 2½ hours—no loss of parts.



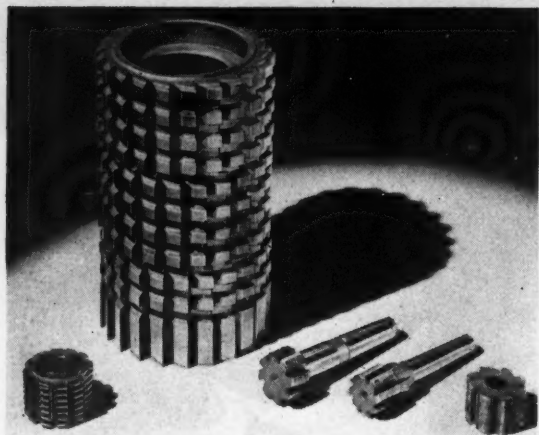
This is just one of hundreds of applications where the ability of "HARDSTEEL" drills to drill, ream, countersink and counterbore steels hardened by any process pays big dividends.

Ask for a copy of the "HARDSTEEL" Operators Manual — 24 pages of practical information that will prove the value of "HARDSTEEL" tools in any service shop. Free on request.

**BLACK DRILL CO. • 5005 Euclid Ave., Cleveland, O.**

# "HARDSTEEL"

DRILLS • REAMERS • TOOL BITS • SPECIAL TOOLS



### Plan-O-Mill Multiple Thread Milling Cutters

The Plan-O-Mill Corp., 1511 E. 8-Mile Rd., Hazel Park, Mich., announces a line of multiple thread milling cutters in National, Whitworth, Acme, V, and

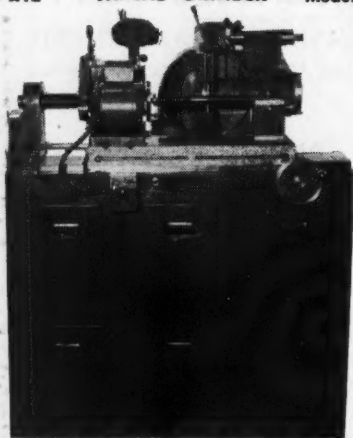
### Plan-O-Mill Multiple Thread Milling Cutters

special forms. The cutters can be obtained either ground or unground for use on any type of thread milling machine, and are available with straight or spiral flutes and with or without special teeth for removal of imperfect threads. A complete range of sizes is offered.

### Tarbonis Cream

Designed to reduce the loss of man-hours resulting from industrial dermatosis, a modified tar product to be known as Tarbonis Cream has been placed on the market by The Tarbonis Co., 1220 Huron Rd., Cleveland, Ohio. The cream, which is said to be greaseless, clinically non-allergic and non-irritating, is recommended for use where there is occupational dermatosis whether due to chemical irritation, chronic ex-

### GRINDALL EXTERNAL GRINDER, TOOL GRINDER, INTERNAL GRINDER 6"x12" THREAD GRINDER Model B



THREAD GRINDING MACHINES  
PORTABLE PRECISION GRINDERS  
BALL BEARING SPINDLES  
**General Machine Tool Co.** Seneca Falls New York

### SHELDON ARBOR PRESSES

SHELDON offers a complete line of Arbor Presses—10 sizes; capacities from 3 to 10 tons; Bench and Floor types with Simple, Compound or Pilot Wheel operating Levers. They are quality tools improved in design and accurately machined, are stronger, handier and more versatile. They have round rams which simplify jig design and can be held in accurate alignment where desirable with SHELDON patented Ram Aligner. Gears are non-stripping alloy steel.

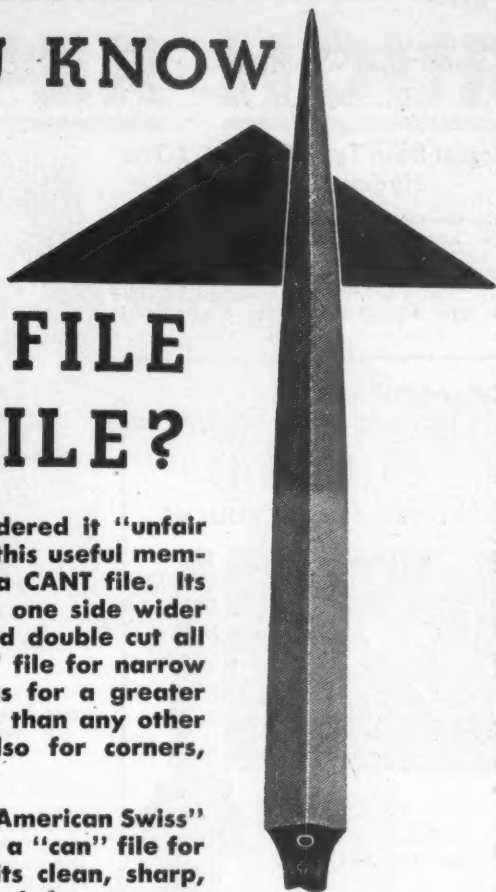
Write for  
Catalog sheet.



### SHELDON MACHINE CO. INC.

4250 N. Knox Ave.  
Chicago, U. S. A.

# DO YOU KNOW WHAT THIS CANT FILE CAN FILE?



We have always considered it "unfair discrimination" to call this useful member of the file family a CANT file. Its triangular section, with one side wider than the other two, and double cut all over, makes it a "can" file for narrow flat surfaces as well as for a greater variety of acute angles than any other triangular file, and also for corners, notches and grooves.

Besides, like all other "American Swiss" Swiss-Pattern Files, it is a "can" file for fast work because of its clean, sharp, long-wearing teeth; and for accurate work because of the uniform hardness of each file throughout its entire length.

American Swiss File & Tool Co., Elizabeth, N. J.

ASK FOR THEM BY NAME

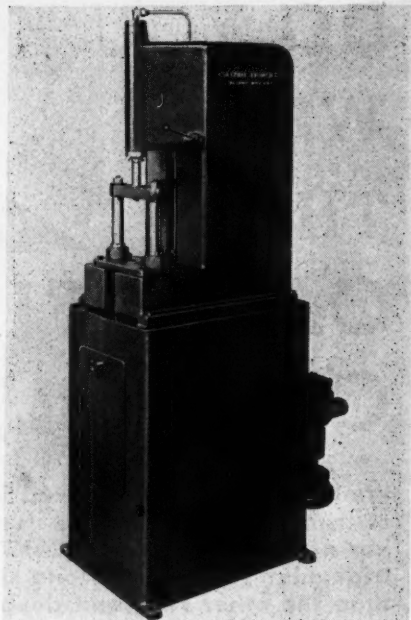
*American Swiss* ★ ★

**SWISS PATTERN FILES**

posure to abrasives, work with cutting oils, reagents, acids, and so on.

## Colonial Base Type "Junior" 1-Ton Hydraulic Press

The Colonial Broach Co., Detroit 12, Mich., announces that its "Junior" hydraulic press of 1-ton capacity is now available as a base type as well as bench type machine. The design of the base type unit is said to be such as to

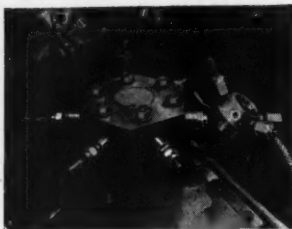


Colonial Base Type "Junior" 1-Ton Hydraulic Press equipped with special pull-fixture for light duty pull-down broaching

**FOR ACCURACY and  
INCREASED PRODUCTION**

# ERICKSON

**Precision COLLET CHUCKS**



Main and Auxiliary  
Turrets Equipped with  
Erickson Chucks.  
**SEND FOR BULLETIN  
"D"**



**ERICKSON STEEL CO.**

2309 HAMILTON AVE.

CLEVELAND, OHIO

enable it to be readily adapted to "pull-down" type broaching operations, the base providing a housing means for puller mechanism and coolant tank. A coolant pump driven by an integral motor is mounted on the rear of the base.

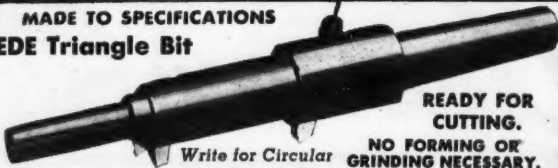
The base type Junior may also be used for push type broaching operations requiring the use of coolant. For assembly operations, both the base and

# EVEREDE

## SPECIAL BORING BARS ★

MADE TO SPECIFICATIONS  
with EVEREDE Triangle Bit

Micrometer adjustment with indicator dial on wrench. Assuring accuracy regardless of bit angle. Furnished with solid bits of Tungsten carbide, "Stellite" or High Speed Steel.



**READY FOR  
CUTTING.**

**NO FORMING OR  
GRINDING NECESSARY.**

Write for Circular

**EVEREDE TOOL CO. 180 N. Wacker Drive, Chicago 6, Ill.**

**WILLIS STUTSON**

# 1600 PER HOUR

*Automatically*  
FEEDS AND SETS  
 $\frac{1}{4}$ " DIAMETER  
**SOLID STEEL  
RIVETS**

THIS versatile "RS" RIVITOR speeds up riveting...does a better job...and *cuts costs* for many industries today! It automatically feeds and sets rivets at rates averaging 1600 per hour!

Solid rivets ranging from  $\frac{1}{4}$ " to  $\frac{1}{2}$ " in diameter are handled rapidly and efficiently (with different tooling) by this machine. Thus, the Tomkins-Johnson RIVITOR offers greater capacity...meets requirements of a greater number of jobs.

Ruggedly built...designed with T-J know-how based on long experience...this RIVITOR meets demands for utmost dependability and long life. Write today for bulletin R-4. The Tomkins-Johnson Co., Jackson, Michigan.

Work requiring up to 36" throat depths can be accommodated. The detachable horn permits simple application of a variety of lower tooling designs.

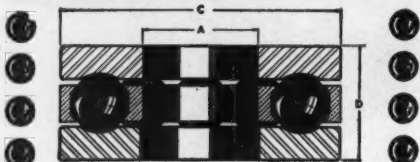
FOR TOUGH JOBS...SPECIFY



## **TOMKINS-JOHNSON** RIVITORS

bench type models are available without coolant reservoir and coolant pump.

According to the manufacturer, the Junior 1-ton incorporates all the major features of larger Colonial hydraulic presses. The pump and reservoir for the hydraulic fluid are incorporated in the main body of the press. The ram has a downward speed of 30 feet per minute, thus making the unit ideal for broaching as well as assembly work. A high speed return of 60 feet per minute is provided for the ram on the upstroke, the length of stroke being adjustable up to a maximum of 12 inches.



TYPE GB GROOVED RACES

### BALL THRUST BEARINGS

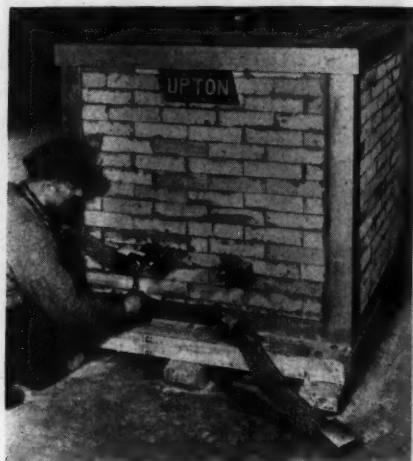
STANDARD SIZES OR SPECIAL DESIGN to your specifications; send sketch or worn sample, regardless of condition, for quotation, without obligation. • Our complete catalog will help you in making selection of bearings—shall we send it?

## THE GWILLIAM CO.

358 Furman St., Brooklyn, N. Y.

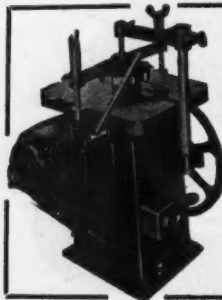
## Upton "Sealed-Electrode" Internally Heated Electric Salt Bath Furnace

An internally heated, electric salt bath furnace, the "Sealed-Electrode" design of which is said to eliminate all necessity for changing electrodes, improve operating efficiency, and permit the



Upton "Sealed-Electrode" Internally Heated Electric Salt Bath Furnace

hardening of tools of unusual length is announced by the Upton Electric Furnace Div., 7450 Melville, Detroit, Mich. Moreover, the design of the furnace is said to make it impossible for work to be burned, permit unusually fast starting, and allow for extremely accurate and uniform heat treating of small tools on a production basis.



## BRAND NEW! READING TAP GRINDER

• Inexperienced workers can use the NEW READING TAP GRINDER on tool and cutter grinders — surface grinders—even bench lathes.

ALSO MANUFACTURERS OF READING BROACH KEYSEATER  
The Reading Bench Machine does not require bushings or guides. No other machine like it. Very fast—capacity from  $\frac{1}{8}$  to  $\frac{1}{2}$  cutter. Low first cost—prompt delivery.

READING MACHINE COMPANY  
READING (CINCINNATI), OHIO



RESHARPEN  
CHAMFER  
EASILY!

Order  
At Once!

# THE LAST WORD IN CAP SCREWS



Reg. U. S.  
Pat. Off.

## SIZES

No. 4 to 1 1/2  
diameter

Where ordinary set screws might fail to hold apply "Unbrako" Self-Locking Hollow Set Screws. Tightened as usual, the knurled points dig in and keep screws tight; yet they can be easily removed and used again and again.



Wherever socket cap screws are needed . . . for Production, Assembly or Maintenance, used Knurled "Unbrakos." They are preferred by mechanics because knurling positively prevents time wasting finger-slip so each turn counts.

Combined in  
"Unbrako" Socket Cap  
Screws are all the de-  
sired features—  
Strength and Accuracy  
plus knurled heads.

40 Years in Business

Knurling of Socket Screws originated with "Unbrako" years ago

## STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 556 BRANCHES BOSTON DETROIT INDIANAPOLIS CHICAGO ST. LOUIS SAN FRANCISCO

August, 1943

MODERN MACHINE SHOP 273

The success of the new design of the furnace is said to be due to a method of sealing the electrodes through the sides of the furnace so that the electrodes can be located beneath the surface of the salt or at the extreme bottom of the pot with none of the heated portions exposed to the air. Since about 90 per cent of the deterioration of electrodes is said to be due to the presence of air in the heated portions, the chief source of electrode trouble is claimed to be entirely eliminated with the Sealed-Electrode design. The only portions of the electrodes exposed to the air in the furnace are said to be so completely cooled by circulating water that the exposed portions are held at about body temperature. Thus, there is no oxidation of the exposed portions due to heat.


The design of the Upton Sealed-Electrode Electric Salt Bath Furnace is such as to permit it to be built to any reasonable depth without any increase in the area being required. Deep type furnaces can be operated with salt to any required depth. Thus, a furnace initially obtained for operation at a depth of 48 inches can be operated at depths down to 4 inches.

The furnace, which can be adapted to heat-treating operations requiring temperatures of from 1,200 to 2,500 deg. F.,

may be used in conjunction with the Upton heat measuring control. Of special interest to producers of small tools on a small production basis is the fact that the furnace can be operated on merely enough salt to heat the tools, thereby saving considerable power. Since only about 5 inches of salt are required to hold the furnace over, maintenance costs between actual heat-treating operations are reduced to a minimum. According to the manufacturer, the extremely fast starting of the furnace is due to the small amount of salt required to hold the furnace in operation. About 3 inches of salt is said to be ample for starting the furnace.

### Globe A.C. Coil Winder

The Globe Tool & Engineering Co., 425 Davis Ave., Dayton, Ohio, announces the addition of a variable speed coil winder for alternating current operation to its line of coil and armature winding equipment. The winder is available in models covering a range of speeds of from 10 to more than 4,000 r.p.m. Speeds are controlled by a floor mounted foot pedal which also provides



● Diamonds vary in quality and it is important to use the proper kind for a given job. "Bargain diamonds" are not an economy. If you don't know diamonds, know your diamond dealer. Our 45 years in this field merits your confidence.

**ACME DIAMOND TOOL COMPANY**  
15 MAIDEN LANE NEW YORK, N. Y.

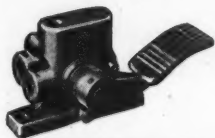
# COMPLETELY AUTOMATIC

*Thanks  
to*  
**NOPAK**  
Air Valves  
and Cylinders

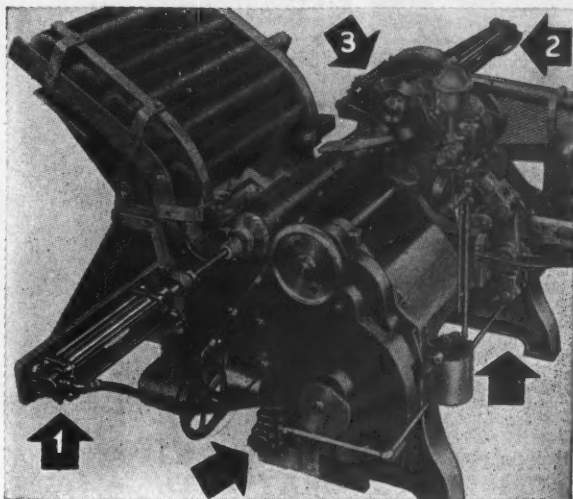
Arrows indicate location of NOPAK Air Cylinders and Operating Valves.



3 Model "A" Air Cylinders, in varying strokes and sizes, are used on each V & O Trimmer.



3 Model "R" Foot Valves, adapted to cam operation, actuate each cylinder.



V & O Cartridge Case Trimming Machines — built by The V & O Press Co., Hudson, N. Y. — are a fine example of the application of air power to precision machine movements. Three Model "A" Air Cylinders are used on each machine: — One for gauging and trimming, the second for ejecting the trimmed cases, and the third for stripping scrap metal from the trimming chuck. Each cylinder is controlled by a Model "R" NOPAK Foot-Type Valve actuated by cams accurately synchronized to maintain production at 18 cases per minute. Inquiries are invited from machine designers, tool engineers and production managers who may be able to use similar applications of air or fluid power to master specific problems of design or production.

**GALLAND-HENNING MFG. CO.**  
2758 SOUTH 31st STREET • MILWAUKEE 7, WISCONSIN

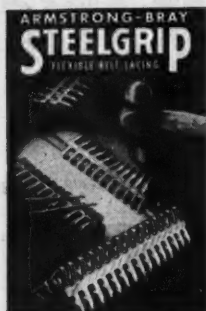
*Representatives in Principal Cities*

# **NOPAK** VALVES and CYLINDERS

DESIGNED for AIR or HYDRAULIC SERVICE

A 4063-1/2 I-AA

MODERN MACHINE SHOP 275



### STEELGRIP BELT LACING

A strong lacing for all types of belts. Put on with a hammer in a few minutes. Clinches smoothly into belt, compresses ends, prevents fraying. 2-piece hinged rocker pins provided. 8 sizes. In boxes, handy packages, cartons and long lengths.

Write for catalog sheets.

## ARMSTRONG - BRAY & CO.

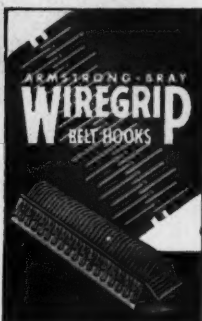
"The Belt Lacing People"

5346 Northwest Highway

Chicago, U. S. A.

### BELT LACING Both types from 1 source

BELT HOOKS come with blue aligning cards that prevent waste—every hook can be used. Protects fingers. Applied with a WIREGRIP or any other standard Belt Lacing Machine. 6 sizes.



### ARMSTRONG - BRAY WIREGRIP BELT HOOKS

for control of the self-energizing brake and motor switch of the winder.

The accompanying illustration shows a direct-drive bench model which is capable of winding wire sizes No. 20 to 42 into coils up to 3 inches in diameter x 3 inches long. The unit is equipped with a counter which is designed to indicate



Globe A.C. Coil Winder

up to 10,000 wire turns and can be easily read at high speeds. A spindle is provided for easy attachment of winding forms.

GET QUICK DELIVERIES ON

# FRAY

Kurl Kut  
END  
MILLS

FOR PRECISION WORK  
AND LONGER LIFE

Write to Dept T. for catalog



**FRAY** TOOL & REAMER CO.  
a subsidiary of  
Fray Machine Tool Co., Inc.  
503W Windsor Road, Glendale 4, Calif.



## GEARED FOR VICTORY

BEVEL — HELICAL  
SPUR — WORM



THE TAYLOR MACHINE CO.

1917 EAST 61st ST.

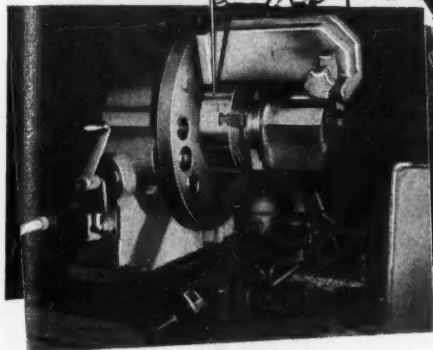
CLEVELAND

OHIO

"TAYLOR - MADE"

# mount 'em

# properly...



## and you can ride 'em hard

**W**HEN you mount a chuck on a machine tool spindle, you're doing a **PRECISION** operation . . . one that controls in a large measure the accuracy of the work that the machine tool will turn out.

Of course, with the modern, simplified, quick-mounting spindle noses such as the four standard types shown on this page, the job has been made very quick and easy. But it is still . . . in fact, even more so . . . a **PRECISION** operation. A few times of "slapping her on" without making sure that *all* bearing surfaces are absolutely free of dirt or chips . . . a few times of wrenching up tight before being properly and truly seated . . . will do damage that will plague you for evermore.

### MAKE SURE EVERY OPERATOR, EVERY TIME, DOES THIS:

1. Carefully wipes clean all bearing surfaces with a soft clean cloth.
2. Takes the few extra seconds to bring chuck onto spindle slowly and carefully.
3. Tightens all bolts "progressively", first a few turns on one, then a few turns on the next, till all are uniformly tight.

4. NEVER force a chuck into position. If it doesn't "go" smoothly, something is wrong.

We are anxious to help you, not only to secure the essential chucks you need, but also to make sure that every chuck is doing its job most efficiently. We will be glad to send you reprints of this advertisement and copies of our "Chuck-Check" cards on request. The Cushman Chuck Company, Hartford, Conn.



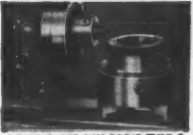
THREADED SPINDLE NOSES



AMERICAN STANDARD TYPE A-1



CAM LOCK TYPE D-1



LONG TAPER KEY DRIVE TYPE S



*These small cards can be given to operators or put on bulletin boards. They'll help save time, save chucks and reduce spoilage.*

# CUSHMAN

## A World Standard for PRECISION

## L & R "General" Precision Cleaning Machine

Especially designed for use in the production of electronic tubes and related devices, the L & R "General" Precision Cleaning Machine shown in the accompanying illustration has been added to the line of self-contained cleaning units for cleaning, rinsing, polishing, and drying small metal parts which is now being marketed by the L & R Mfg. Co., 54 Clinton St., Newark, New Jersey.

Arranged for easy operation by women workers, the machine is equipped with



L & R "General" Precision Cleaning Machine

## HAMILTON SWISS TYPE GEAR HOBBERS



...for accuracy  
and speed in  
hobbing  
PINIONS,  
GEARS and  
SECTORS.

### TWO MODELS

No. 00 SPUR GEAR  
HOBBER for work  
up to 2" dia.

No. 1 SPUR and  
SPIRAL GEAR HOB-  
BER (illustrated)  
for work up to 6"  
dia.

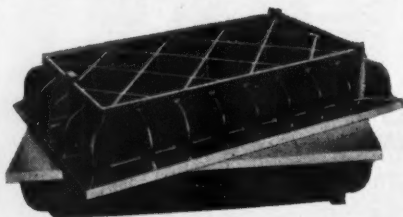
Write for further  
details to

**TRIPLEX MACHINE  
TOOL CORP.**

Manufactured by  
**THE HAMILTON TOOL CO.**  
Hamilton, Ohio

Exclusive Sales Agents  
125 Barclay St.,  
New York 7, N. Y.

## REID PRECISION-PLANED SURFACE PLATES



Accuracy guaranteed on 12" x 18" size within .0005". On 36" x 72" within .0015". Thoroughly normalized and weather seasoned Reid Precision-Planed Surface Plates have proved thoroughly satisfactory on work to close limits.

Excellent delivery—Write for prices—details.

**TOOL ENGINEERING SERVICE CO.**  
241 Washington Ave. Nutley, N. J.

# PRECISION

IS BUILT INTO EVERY OUNCE OF THESE  
MEEHANITE METAL SURFACE PLATES

Meehanite Metal is of fine close grain, uniform texture, unusual strength and solidity . . . metallurgical qualities that make high precision surface plates. These are one-third heavier than any other quality plates, and the weight is scientifically distributed by the honeycomb base. The surfaces are handscraped to extremely close tolerances.



LOOK  
FOR THIS HONEYCOMB BASE!

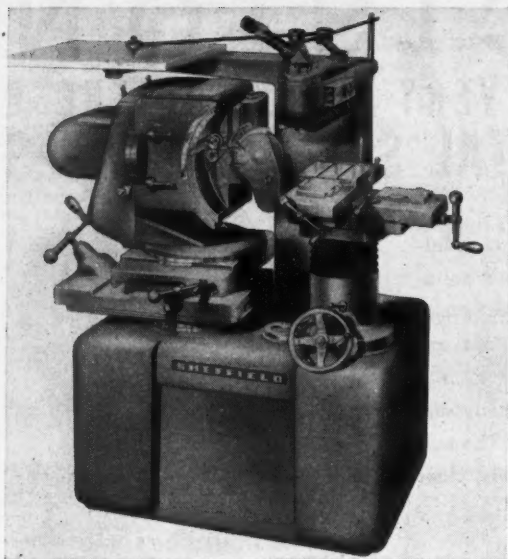
| Size      | APPROX. WEIGHT | HEIGHT | TOLERANCE | NET PRICE |
|-----------|----------------|--------|-----------|-----------|
| 3 1/2 x 4 | 5 Lbs.         | 2 1/2" | .0001"    | \$ 12.50  |
| 6x 6      | 11 "           | 2 1/2" | .0001"    | 19.00     |
| 8x12      | 38 "           | 3 1/2" | .0001"    | 35.00     |
| 9x12      | 40 "           | 3 1/2" | .0001"    | 35.00     |
| 12x12     | 50 "           | 3 1/2" | .0001"    | 43.00     |
| 12x18     | 85 "           | 4"     | .0001"    | 68.00     |
| 14x18     | 100 "          | 4"     | .0001"    | 75.50     |
| 18x18     | 140 "          | 4 1/2" | .0001"    | 98.00     |
| 18x24     | 200 "          | 5"     | .0001"    | 133.00    |
| 18x36     | 310 "          | 6 1/4" | .0002"    | 174.00    |
| 20x30     | 325 "          | 5 1/4" | .00025"   | 190.50    |
| 24x24     | 334 "          | 6 1/2" | .00025"   | 180.00    |
| 24x36     | 475 "          | 7"     | .00025"   | 275.00    |
| 30x36     | 510 "          | 7"     | .00025"   | 345.00    |
| 30x60     | 1425 "         | 10"    | .00025"   | 596.50    |
| 31x78     | 2100 "         | 10"    | .0003"    | 827.00    |
| 48x72     | 4500 "         | 12"    | .0004"    | 1054.00   |
| 48x96     | 6000 "         | 12"    | .0005"    | 1468.00   |

FOR PROPELLER INSPECTION: MEEHANITE METAL  
RIBBED PATTERN

|       |          |    |        |        |
|-------|----------|----|--------|--------|
| 8x42  | 238 Lbs. | 6" | .0001" | 98.00  |
| 10x36 | 225 "    | 6" | .0001" | 115 70 |

Other sizes to specification. Angle plates and straight edges of Meehanite Metal also available. Good deliveries on most sizes. Write for folder. Send for Precision Production Tool Catalog 42.

**ACME TOOL COMPANY** 198 CHURCH STREET  
NEW YORK, N. Y.



Sheffield Micro-Form Grinder

### Sheffield Micro-Form Grinder

Through the use of a 50-to-1 pantograph and a microscope, the Sheffield Corporation, Dayton, Ohio, has developed a grinder designed to finish grind most accurately any desired profile within its range directly from the drawing. This device eliminates the need for templets and masters, with a saving of many man-hours and considerable expense.

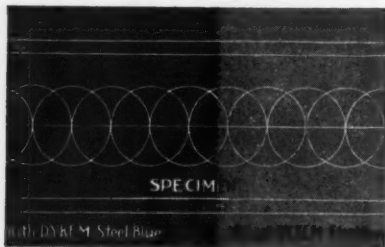
The machine, to be known as the Sheffield Micro-Form Grinder, is especially suited for the grinding of both circular and flat form tools, templets, profile gages, cams, dies, and so on from hardened materials, including tungsten car-

bide. It is not limited by the regularity or irregularity of the work, nor by straight lines or circular or irregular curves.

In operation, a layout drawing made to a scale of 50 to 1 is placed on the drawing table of the pantograph, which is equipped with a microscope mounted on a short arm. With the tool set to cut the material of the workpiece, the operator follows the lines on the layout drawing with the pantograph stylus. As the stylus moves, so moves the microscope, the operator following the point indicated by crossed hairs in the microscope with the grinding wheel and thus generating the design dictated by the movement of the stylus.

The manufacturer states that an accuracy of 0.0003 inch is easily obtained in the grinding operation, and that still closer limits can be held after the operator has become reasonably familiar with the machine. This accuracy is not affected by wheel wear.

An unusual arrangement of cross and circular slides and other adjustments which provides the effect of a double universal joint makes it possible to set the grinding wheel at any desired angle, to move in any direction. This permits the forming of any shape, no matter how intricate, and also makes possible the grinding of rake and clearance angles simultaneously with the grinding of the form. No complicated calculations are required to reconcile dimensions, as the work is viewed in the operating plane and the profile is ground



With DYKEM Steel Blue

## DYKEM STEEL BLUE

**Stops Losses in Making Dies and Templates**

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

### THE DYKEM COMPANY

2301 F. NORTH 11th ST.

ST. LOUIS, MO.

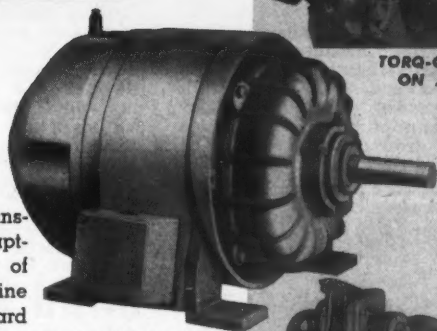
(In Canada: 444 Pacific Ave., Toronto, Ont.)

# TORQ

*Selective Transmissions  
and  
Motors*



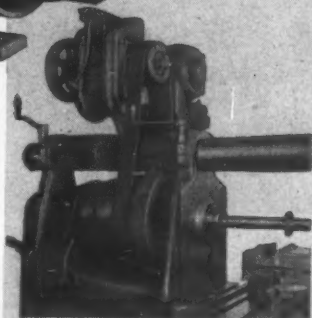
TORQ-QUA-MATIC  
ON A LATHE



● "Torq-qua-matic" transmissions are readily adaptable with a wide range of applications in the machine tool field. Made in standard and special sizes to meet exact requirements. All gears and shafts are of special heat treated alloy steel for long life and maximum capacity. Will increase production efficiency 25 per cent or more.

Write for illustrated folder describing  
Torq-qua-matic transmissions.

**Torq Motors and Transmissions  
provide Power in Reserve.**



TORQ-QUA-MATIC ON A MILLER

**THE TORQ ELECTRIC**

6601 CARNEGIE AVE.



**MANUFACTURING CO.**

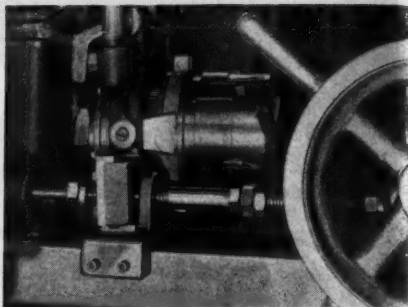
CLEVELAND, OHIO

directly from the layout.

The table for the layout is 20 inches square, which makes it possible to grind an area 0.400 by 0.400 inch in one setting. Profiles of greater area can, however, be handled with the same equipment. Work up to 10 inches wide and 4 inches thick can be accommodated. Stock can be stacked to a maximum height of 2 inches to produce a number of identical parts in one operation. The machine can be used reversely to make 50-to-1 layout drawings from parts for which no profile drawings have been made, and for checking parts against the layout drawings.

### Quick-Opening Mechanism for Lanco Die Heads

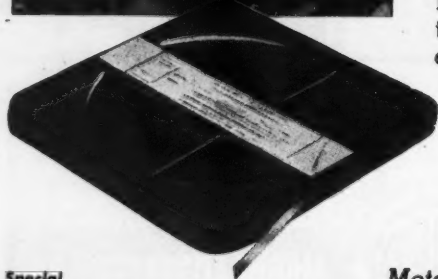
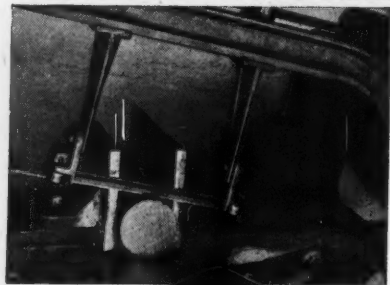
In cutting threads to close tolerances, it is sometimes necessary for the die head to open instantaneously so that the travel of the threading machine carriage, ordinarily required to open the head, will not affect the lead or pitch diameter of the work. A mechanism for imparting this action to the 7V Lanco hardened and ground die head when applied to a Landis standard bolt thread-



Quick-Opening Mechanism for Lanco Die Heads

ing machine has been developed by the Landis Machine Co., Waynesboro, Pa.

The quick-opening mechanism comprises a spring in combination with a latch and latch block arrangement in addition to the conventional yoke employed to open and close the head. When the die head is in the closed position, this yoke also locks independently of the head. As the yoke closes the head, tension is built up in an extension spring, one end of which is attached to



**Special Containers**  
for narrow width  
rolls, 100' length.  
Convenient to use.

## ATLANTIC ★ Band Saw Blades Speed Up

### Metal Cutting Production

Atlantic Metal Cutting Band Saw Blades have been developed through twenty years of research and specialization.

Send for Free  
Booklet

**ATLANTIC  
SAW MFG. CO.**

*Metal Cutting Band Saws  
Exclusively*

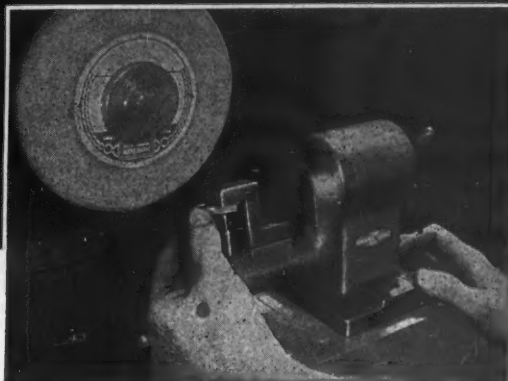
155 Brewery St., New Haven, Conn.



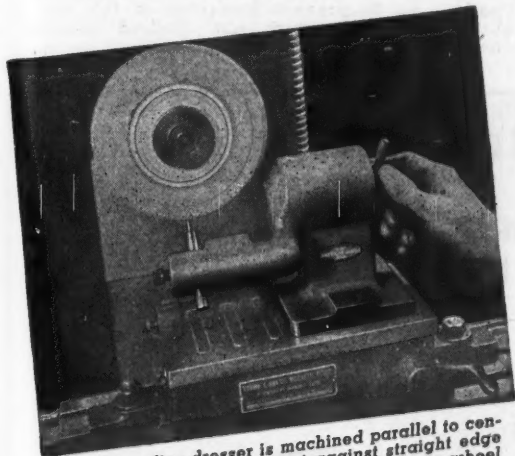
# GRINDING WHEELS DRESSED

**quickly,  
accurately  
with UNIVERSAL  
Radius Dresser**

You can do a better job by grinding the radii of your tools, dies and gages with grinding wheels dressed to gage - block accuracy. The American Radius Dresser is



*Note the ease of setting up the radius dresser by use of gage blocks. Z-block is clamped to swivel arm and removed after diamond has been set for correct radius.*



*Base of radius dresser is machined parallel to center line of swivel arm to set against straight edge of magnetic chuck. Not necessary to remove wheel in guard. Swivel arm operated by hand wheel in safe, convenient position.*

a sturdy, compact, precision-built unit that is easily, quickly set. It will clear  $7\frac{1}{2}$ " grinding wheel and dress convex or concave radii up to 1 inch.

Swivel arm pivots on hardened and ground steel shaft with large thrust surfaces at ends. Dustproof bearings; constant lubrication.

Send for Bulletin 43-M, including details on time-saving American Amplifying Gages, Hole Checkers, Bench Centers and Lapping Plates.



**THE AMERICAN GAUGE CO.**  
*125 Bayard Street DAYTON, OHIO*

the machine bed and the other to the yoke. As the threading operation progresses to the point where the die head is to be opened, a sleeve on the trip rod raises the latch from the latch block, thus releasing the yoke and permitting it to snap back quickly—an action which causes the head to open instantaneously.

The quick-opening mechanism, which can be applied to Landis  $\frac{3}{8}$ -inch single or double head threading machines now in service, is fully adjustable for threads of different lengths by moving the latch operating sleeve on the trip rod and by moving the latch block bracket along the ways of the machine. The sleeve tension is adjustable.

### Acromark Wood Handle Metal Stamp

A wood handle metal stamp for use in marking soft materials such as leather, rubber, fiber, fabric, cork, paper, and cellophane has been developed by The Acromark Co., 9 Morrell St., Elizabeth, N. J. The stamp, which can be used with ordinary rubber stamp or felt pads, is said to be particularly useful for marking war products such as web belts,



Acromark Wood Handle Metal Stamps

canvas bags, shoe tops, safety belts, uniforms, rubber boats, gas masks, officers' caps, and cap covers and other parts and materials.

The wood handle is shaped to fit the hand and is tapered to the face for easy positioning of the marking die, which is made of zinc, brass, or steel and is attached to the handle at each end by a countersunk head wood screw. The marking die is deeply engraved so as to prevent smearing of ink and is available with any desired lettering, numbering, or design.

## GRAND RAPIDS Combination Tap and Drill Grinder MOTOR DRIVEN



No. 10-B

**SHARPENS TAPS No. 6 to  $1\frac{1}{2}$ "**  
2-3-4 Flute, Right or Left Hand.

**SHARPENS DRILLS  $\frac{1}{8}$ " to  $1\frac{1}{2}$ "**  
2 or 3 Flute, Straight or Taper Shank.

Other Combinations also available.

Write for Catalog.

**GALLMEYER & LIVINGSTON CO.**  
336 Straight Ave., S. W. • Grand Rapids 4, Mich.

# Machine Production Doubled!

Note the grinding time in this Production Test Run — a generous 50% saving! Note also that Cortland Segments cut fast and cool, with less wear, and require no dressing.

*Production Test Run on Abrasive Machine Tool Co. No. 34 Vertical Surface Grinder with reciprocating table. Wheel speed, 2570 R.P.M. Work: Rear sight base for 30 cal. gun: Arma steel casting; 4 pieces per table load.*

6" Cup Wheel  
Competitive  
Make

|                    |                   |
|--------------------|-------------------|
| Total Feed.....    | .015              |
| Stock Removed..... | .010              |
| Wheel Wear.....    | .005              |
| Grinding Time..... | 2 min.<br>40 sec. |

Send for the new bulletin that illustrates and describes Cortland Chuck and Segments.

## CORTLAND 8-IN. CHUCK AND SEGMENTS

|         |
|---------|
| .013    |
| .010    |
| .003    |
| 1 min.  |
| 12 sec. |

### DIAGONAL SHEARING

Shock and resistance minimized as narrow end of segment starts grinding action. Large surface still exposed to coolant. Diagonal motion of straight inner edge of segment produces powerful shearing action. Increasing contact combines rapid stock removal with minimum heating.

Maximum area of segment in contact with work momentarily. As segment continues to pass across work, grinding area becomes smaller, with more surface exposed to coolant.



# CORTLAND

*Segmental Chucks*  
CORTLAND GRINDING WHEELS CORP. • CHESTER, MASS.

**New Model**  
**LYON**  
**Hydraulic**  
**ELEVATING TABLE**

**Now offering  
 many new  
 features for**



1. Handling dies.
2. Elevating or revolving work to convenient positions for welding.
3. Transferring heavy parts from one level to another level.
4. Supporting overhanging work.
5. Bringing work to convenient heights for the operator.
6. Other operations where table-revolving and easy foot-actuated elevation are advantageous.

• Latest improvements give many advantages over the previous model of LYON Hydraulic Elevating Table that has proved so popular.

• Standard model carried in stock. Seven optional features can be applied to the standard model before shipment, or can be supplied later after table has been put into use.

• Special models can also be supplied.

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**LYON-Raymond Corporation**

MATERIAL HANDLING EQUIPMENT

258 Madison St.

Greene, N. Y.

**"Cablemaster"**

A lightweight cable hoist, the design of which enables it to be readily installed near machine tools for use in lifting parts into and away from the machines, to be known as the "Cablemaster," has been developed by the Industrial Equipment Division, The Master Electric Co., Dayton, Ohio. Arranged for easy operation by women workers,



250-Lb. Capacity "Cablemaster"

the hoist is also said to be particularly useful in inspecting machine tools.

The Cablemaster is available in 250, 500, and 1,000-lb. capacities. The 250-lb. capacity model illustrated herewith weighs 65 lb., is available with hook or trolley mounting, and can be quickly attached to present monorail mounting or sturdy special 4-foot jib crane as shown.

Outstanding features of the Cablemaster include anti-friction bearings throughout; high grade cable (U. S. Air Corps standard); trouble-free random wind drum; quiet-operating, self-locking

**ME**

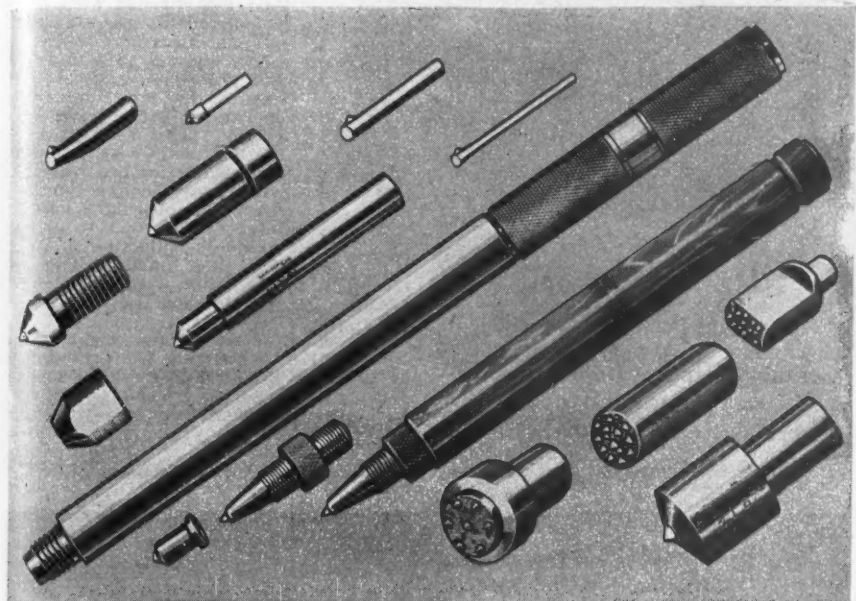
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# For Over Half a Century



## MEYERS "DiaBrasive" DIAMOND TOOLS

For over half a century, literally hundreds of thousands of selected industrial diamonds have been expertly processed with our specially designed equipment, and distributed universally to establish W. F. Meyers Company permanently in the industry, synonymous with excellent diamond tools and desirable service.

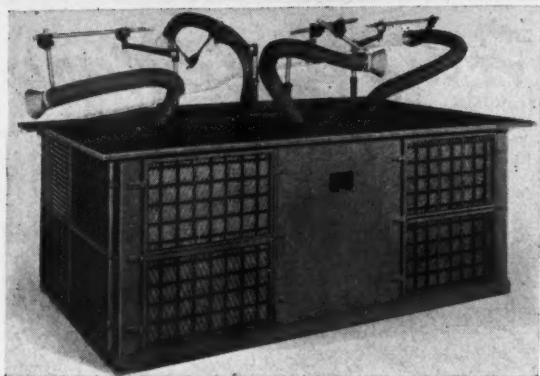
Through the years we have engineered and perfected not only various outstanding progressive tools, but also manner of processing.

Outstanding features of our method of diamond mounting are the means of placing the diamond point on precise center, the unusual method of processing and applying the metal to the diamond and the perfect adaptability of the metal to this specialized use.

We invite you to share in the results of our wide experience by extending the services of our engineering department. Write direct or to the nearest representative.

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**REPRESENTATIVES:** The Cleveland Duplex Machinery Co., Penton Building, West 3rd & Lakeside Avenue, Cleveland Ohio • Chas. W. Boyle, 854 No. Sweetzer Avenue, Los Angeles, California • Hugo-Fayle Supply Co., 1011-13 Caroline Street, Houston, Texas • Charles R. Yerger, 7800 Bayard Road, Philadelphia, Pa. • Chandler Machinery Company, 120 Houston Street, N. E., Atlanta, Georgia • Conn. Industrial Supply Co., 690 Chapel Street, New Haven, Connecticut • Good-speed-Detroit Company, 2832 East Grand Boulevard, Detroit, Michigan • Charles A. Jones, 888 Union Street, Brooklyn New York • Fred Werner, 6648 Washington Avenue, St. Louis, Missouri • Arthur Zeissler, 3109 North Drake Avenue, Chicago, Illinois • Montgomery & Company, Inc., 129 Crosby Street, New York, New York • Will Ingalls, District Manager, 1623 Carew Tower, Cincinnati, Ohio • Indiana Manufacturers Supply Co., 880 Massachusetts Avenue, Indianapolis, Indiana • Charles M. Rollit & Co., Foshay Tower, Minneapolis, Minn. • H. O. Georges, 430 Forest Avenue, Cincinnati, Ohio



**Schmiege Integral Dust Collector  
and Grinding Bench**

worm gear drive; positive-acting brake,  
and oil bath for reduction gears.

### **Schmiege Integral Dust Collector and Grinding Bench**

A four-station grinding bench with in-  
tegral dust collector has been developed  
by Schmiege Industries, 352 Piquette Ave.,

moved by filters, while a special plenum  
chamber is provided for the removal of  
heavy particles.

The bench is of rugged wood frame  
construction, permitting the attachment  
of grinding heads and fixtures, and is  
equipped with a heavy wood top, Mason-  
ite covered. Variations in design are  
available to suit production require-  
ments, each unit being engineered for  
the particular job it is designed to do.

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Here's a complete line of  
**Single and Double End Mills.**

They save time and money.  
**SPECIFY PROGRESSIVE SHEAR-CUT END MILLS.**  
Write for catalog and prices.

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2345 WOLCOTT ST. **FERNDALE, MICH.**

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for every job**



War plants are taking practically our entire output of clamps — and gaining increased efficiency and improved results.

These heavy demands make it difficult to fill all orders. See your supplier—he'll do his best to help.

Stock sizes range from  $\frac{3}{4}$ " to 10" openings, from  $\frac{1}{4}$ " to 16" deep. A complete line in all patterns and sizes.

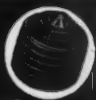


**The CINCINNATI TOOL CO.**

*Est. 1879*

1947 WAVERLY AVE. CINCINNATI, OHIO

*Need an  
Extra  
Hand?*



## Transfer Points Insure

### Accurate Layouts In Die Making

A real helping hand! Heilmann Transfer Screws are quick, accurate markers in setting dies. No wrench needed. Six hardened screws nested in holder (see below). Uniform height hex base to point, insuring clear uniform indentations.

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|       |           |
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| 3/16" | ...\$1.50 |
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| 5/16" | ... 1.25  |
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Also  
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**HEIMANN MFG. CO.,**  
URBANA, OHIO

**IT'S  
FAST!**



**IT'S  
HANDY!**

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Madison-Kipp tool-makers originated the first really high speed grinder. They know a great deal about the practical side of grinder design and grinder usage. They think the new Model H is the best all around off-hand tool they have ever tried and we are sure you will agree with them. If you are doing priority work . . .

**ONLY  
\$29<sup>75</sup>**

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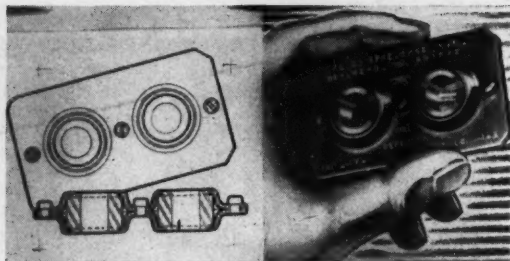
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**PROMPT DELIVERIES,  
ON THE  
HIGHER PRIORITIES**

**MADISON-KIPP CORP.**

208 WAUBESA STREET

MADISON, 4, WIS., U. S. A.



Northern Ring Gage Holder

The unit is furnished complete with fan, four suction hoses, and motor with combination starter and push button.

### Northern Ring Gage Holder

Manufactured by the Northern Tool & Die Co., 330 N. Albany Ave., Chicago, Ill., the Northern Ring Gage Holder shown herewith is said, by application of pressure axially, to hold twin ring gages firmly without danger of distortion. In addition, the design of the holder is said to eliminate the need for grinding the outside diameters of rings to close tol-

erances in order for them to be properly held. Outside diameters can be rough machined and the rings quickly placed in the holder with full assurance that they will be held firmly and with no distortion, it is claimed.

Light in weight, the Northern Ring Gage Holder is made from stamped steel and is available in four sizes.

### Cleveland Tramrail Motor-Driven Pipe and Rod Carrier

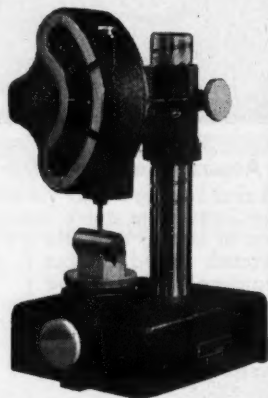
A motor-driven pipe and rod carrier developed by the Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio, is designed to permit the cab operator to pick up 1,500 lb. of stock in 12-foot lengths from the storage room, transport and set it in racks at fabricating machines without the aid of any floor men. Since the unit travels overhead, its use eliminates the need for aisles and makes possible the saving of much floor area.

## AMIC Comparator

### A PRECISION INDICATING GAGE

Designed to replace special gages, flush pin gages, snap, height gages. For accurate, convenient and quick checking of components, either in the tool room or on the production line. Permits precise gaging throughout the whole day without eye fatigue. Each division of the scale represents 1/10,000th of an inch. Interpolations of .00005 easily achieved. Clear readings on 6" scale with inch and millimeter readings. Magnification is 1000. Measuring capacity is  $\pm .003$ " and  $\pm .05$ mm.

Note our improved list of accessories designed to suit your particular measuring problems. Thread measuring device, serrated anvil, vee-blocks, centering fixture, ball anvil and several types of backstops.



*Our extensive experience will solve your measuring problems*

**AMERICAN MEASURING INSTRUMENTS CORP.**  
240 West 40th St. New York, N. Y.

*Manufacturers of Gages, Jigs, Fixtures, Service Tools and Precision Units*



**Quality**

## THE NICHOLS MILLER

**Offers Speed with Tool Room Accuracy**

Modern precision construction and remarkable adaptability make the Nichols a natural choice for dependable performance.

Insets illustrate FLEXIBILITY. Upper view shows Profile-milling cam slot using template and follower. Lower view is typical horizontal set-up, milling clutch teeth using simple indexing fixture. Moderate price.

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BY INSTALLING  
**PADDOCK Ball Bearing BAND SAW GUIDES**

Recommended for New and Old Machines  
cutting all material at any speed.

**SENT ON 10 DAYS' TRIAL**

The use of Paddock Ball Bearing Guides increases the efficiency of the machines so that more and better work can be done. The hazard of operation is reduced. Most of the blade breakage is eliminated. Wheels are interchanged—in effect, three sets of guides in one.

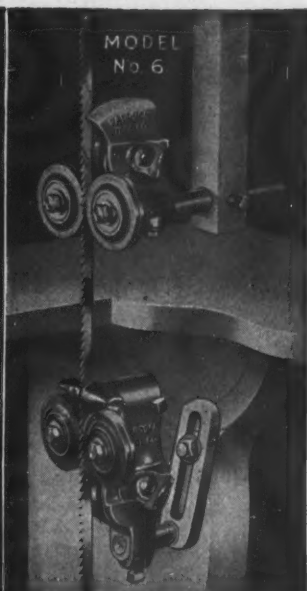
Write for details today and list of prominent manufacturers using Paddock Guides.

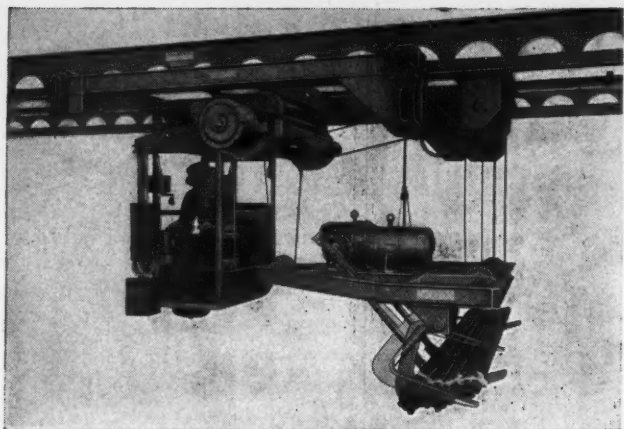
## PADDOCK TOOL COMPANY

Guide Makers Since 1920

1418 Walnut St.,

Kansas City, Mo.





**Cleveland Tramrail  
Motor-Driven Pipe  
and Rod Carrier**

suspension from the carrier which gives it the necessary rigidity for handling loads that are far out of balance. Another factor in providing stability is the double overhead track system on which the carrier travels. This system is designed to minimize swing and is said to aid in removing the danger of loads slipping and falling in transit.

An outstanding feature claimed for the carrier is the safety with which loads can be swiftly moved above men and machines. According to the manufacturer, materials transported need not be in balance nor is it necessary for the operator to spend time in locating the center of gravity of the load. The pick-up fork assembly has a three-point rope

Rod and pipe are handled by two forks which are tilted upward when loading and downward when unloading by a motor-driven crank. The accompanying illustration shows the forks in both positions. A limit switch automatically stops the forks in the upward or holding position when the fork mechanism is not in operation.



## **PERFORATED PILING BOXES USED ON TRUCKS AND RACKS**

**We are well equipped to fabricate boxes, barrels, shelving and other sheet metal products in all gauges to your own specifications. Our general catalog mailed on request.**

**THE CLEVELAND WIRE SPRING COMPANY • SHEET METAL DIVISION • CLEVELAND, OHIO**

# NEED GOOD COOLANT PUMPS?

**BRADY-PENROD MODEL 7500**  
Centrifugal coolant pump and tank—a neat, compact unit highly suitable for use where abrasives are a factor.

Good pumps PAY. Buy the kind used as *standard equipment by many leading machine tool manufacturers*—BRADY-PENROD. Model 7500, shown above, is one of a complete line designed to meet every need. It handles all coolant liquids—kerosene, solubles, light and medium oils, etc., 4 to 100 g.p.m. Tank sizes, 6, 15, 30 gal. or larger, with as many hoses and nozzles as required. Discharge pipe is cast integral with pump and brought to outside of tank. The hinged cover allows cleaning without disconnecting return line.



All BRADY-PENROD pumps have heavy-duty, standard construction NEMA motors,  $\frac{1}{2}$  to 1 H.P., any current, phase, cycle.

*Brady-Penrod*

Incorporated

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## High Precision Spur and Helical GEARS

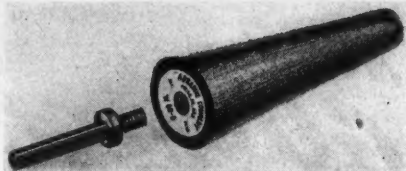
**Interchange — Quiet**

We machine your blanks or cut from bar stock. We cut and grind gears on Mang Machines in our Jersey City Plant to an Accuracy of Profile up to .00012"; of Pitch up to .00024" and concentricity of Pitch Circle, within .0060". Gears cut to usual standards without grinding. (We do not make worm or bevel gears.)



**SWISS-AMERICAN GEAR MFG. CO.**  
5001 CHRYSLER BLDG. NEW YORK, N. Y.

The fork assembly can be raised or lowered as required. The carrier shown has a lift of 8 feet, however, carriers with lifts of 20 feet or more can be furnished if required. The hoisting speed of the unit is 20 feet per minute and the travel speed is 300 feet per minute. Similar carriers for handling heavier loads and materials of other lengths than those handled by the carrier shown can also be supplied.



Victory Point

### Victory Points

A line of abrasive mounted wheels and points with demountable spindles, to be known as Victory Points, is announced by the Abrasive Company, Tacony and Fraley Sts., Philadelphia 37, Pa. The design of the Victory Point is such that the spindle can be removed and used again and again on other points, with a resultant savings of critical steel for other war production purposes.

The Victory Point consists of a threaded porcelain bushing which is inserted in and fused to the abrasive wheel mass at the high heats of kiln temperatures during the vitrification process. The demountable spindle simply screws into the porcelain bushing and, according to

the manufacturer, forms a tight, perfect fit so that the spindle cannot break off, pull out, twist or turn.

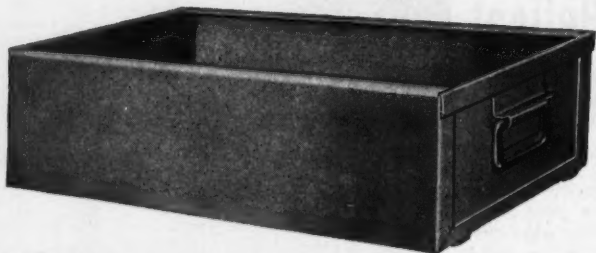
Victory Points are made in standard grain and grade combinations in vitrified bonded wheels or points. The size of the demountable spindle is limited to  $\frac{1}{4}$  inch in diameter x  $1\frac{1}{4}$  inches in length.

### Revolute 8Q Printer

Designated as the Revolute 8Q Printer, a fast-acting, compact, easy-to-operate machine which is designed to expose blueprints, direct process prints, and sepia negatives at speeds of from 6 inches to 32 lineal feet per minute is

**IMMEDIATE SHIPMENT!**

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Production  
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#### STACKING BOXES

An ideal all-purpose shop box. Sturdy all-welded construction; drop handles each end. Skids act as a positive stacking lock and re-inforce box at point of maximum wear.

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| No. 303—9" x 13½" x 4½" | — 19 Gauge | ..... \$ .75 |

Prices F. O. B. Factory, Philadelphia

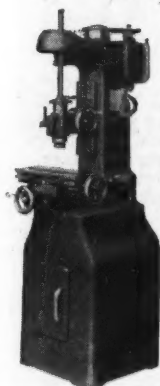
**AMERICAN METAL WORKS, INC.**

1501 GERMANTOWN AVENUE

PHILADELPHIA 22, PA.

**HIGH SPEED**  
*Precision*  
**DIE WORK, JIG AND  
MODEL MAKING, METAL  
PATTERNS, DRILLING,  
MILLING, REAMING,  
JIG BORING**

*That is why shops  
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**MILLING and JIG  
BORING MACHINES**



From every point of view . . . compactness, rigidity, accuracy, speed and versatility, the Linley Milling and Jig Boring machine can be the busiest unit in a busy tool-room. Eight spindle speeds from which to choose, direct micrometer setting to eliminate pencil figuring errors, counterbalanced quill to remove backlash . . . and a large capacity for such a small (18 1/2" x 20" floor space) machine.

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661 STATE ST. EXTENSION  
BRIDGEPORT, CONN.

August, 1943

W-S Standard Reamers with carbide tips.  
Tapered shank (illustrated) and straight  
shank types. Sizes: 1/8 to 1 1/4.



**STANDARD CUTTERS**  
*available from stock*

REAMERS and many other cutting tools, formerly in the "special" class are now STANDARD with us. The majority of these STANDARD cutters is in stock *most of the time*. Our broad line often enables the consolidation of tool orders and saving of valuable time. Each W-S tool is genuine CARBOLOY tipped. The grade used is the one best suited to do a cutting job on the metals for which the tool was ordered. (Other brands of carbide can be specified.) Carbide tipped tools are not just a specialty with us . . . we make them *exclusively*. You can *expect and get* uniform, high quality results with W-S tools. Write for new FREE Catalog 942 and latest prices. WENDT-SONIS COMPANY, HANNIBAL, MO.

SAVE TIME . . . wire or phone your requirements!

W-S Carbide Tipped  
Core Drills available  
in straight and  
tapered shanks.  
Sizes: 1/8 to 1 1/4.

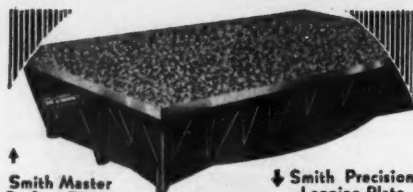


W-S Carbide  
Tipped Centers  
available in Morse,  
Brown & Sharpe  
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**( WENDT SONIS )**

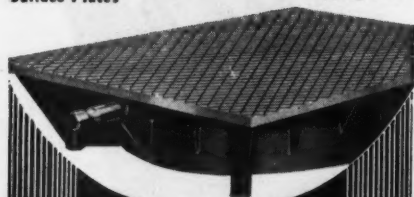
**CARBOLOY CUTTING TOOLS**  
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↑ Smith Master Surface Plates

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Elliptical  
rib construction  
exclusive with Smith



Smith Master Surface Plate and Stand

announced by the Paragon-Revolute Corp., 77 South Ave., Rochester 4, N. Y. Available in two sizes for prints and negatives up to 42 and 54 inches wide, the machine is equipped with a revolving Pyrex glass cylinder 8 inches in diameter which is mounted in metal end rings and supported on ball bearing rollers. The tracing and the sensitized material are held firmly against the cylinder by a series of narrow contact bands which are permanently guided through the machine. According to the manu-



Revolute 8Q Printer

facturer, no adjustments are necessary by the operator in order to keep belts running straight and true, and there is no slippage to cause blurred prints.

Equipment of the Revolute 8Q Printer also includes a quartz high pressure mercury vapor lamp which is enclosed in such a manner as to assure uniform light distribution and freedom from ventilating troubles and to also confine the ozone fumes and prevent their escape into the surrounding atmosphere. The lamp draws approximately 75 watts per lineal inch, and in the 42-inch machine, the lamp plus its controls draws only 3.48 kilowatts. Operating time of the lamp is recorded on a meter connected in the circuit, and the lamp is said to be guaranteed for a period of satisfactory operation of 1,000 hours.

Printing speed of the Revolute 8Q Printer is indicated on a large tachometer conveniently located at the left end of the feeding leaf. Any speed from 6 inches up to 32 lineal feet per minute may be instantly obtained by adjusting a single lever on the feeding leaf.

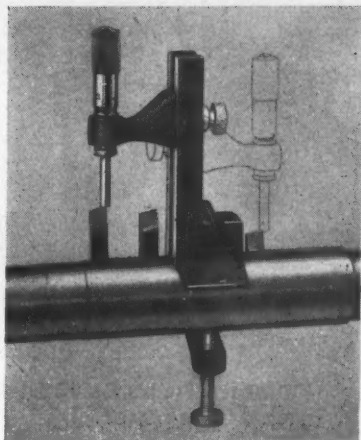
**For fast, accurate setting  
of close-spaced boring tools . . .**

## **BARTELT MODEL "B" PEDESTAL MICROMETER**

*formerly called Bartelt Tool Setting Gage*

★ By reducing the length of the base and by providing slides on both sides of the pedestal, the usefulness of the Bartelt Pedestal Micrometer has been greatly increased with this brand new Model "B." As the illustration shows, tools placed  $3\frac{1}{2}$ " apart can be adjusted in one setting of the gage, by simply changing the micrometer support arm from one side of the pedestal to the other. Also, the shorter base permits attachment to a bar on which the space between tools is as little as 2". This gage will speed up boring work because it greatly reduces the time necessary to get an accurate setting of the cutting tools. As with other models, the base has both flat and vee surfaces so that the Pedestal Micrometer may also be used for a depth gage, a height gage, for inspection, for machine setups, and many other purposes. Three clamps are furnished with the gage, to fit all boring bars from 1" to 5" diameter.

**WRITE FOR CIRCULARS**



**BARTELT  
ENGINEERING COMPANY**

1216 Partridge Ave. • BELoit, WIS.

## **COMET**

### **BORING, FACING and INTERNAL THREADING TOOLS**

For holes from  $\frac{1}{16}$ " upward, 15 different sizes

**Made of Super-High-Speed Steel  
Specially Heat Treated**

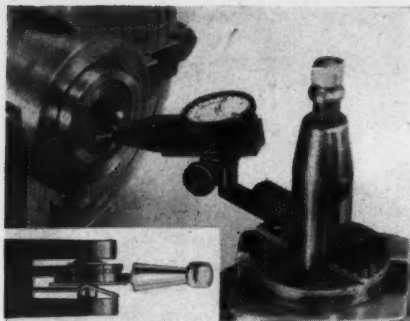
Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long, useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

*Write for complete data.*

**COMET TOOL CO.**

738 Broadway, New York, N. Y.





Federal "Testmaster" Dial Indicator

### Federal "Testmaster" Dial Indicator

A universal type dial indicator which can be readily adapted to the multitude of testing operations performed in machine shops and toolrooms, to be known as the "Testmaster," has been placed on the market by Federal Products Corp., 1144 Eddy St., Providence, R. I. Ruggedly constructed for production use, the indicator features a ratchet in-

dex point which locks in place but can be removed for replacement at any time. The point, which is chrome plated, can be set at any angle within an arc of 180 deg., and its direction of operation can be easily reversed by means of a lever. The size of the point is such as to allow for easy entrance into hard-to-get-at recesses.

Movement of the ratchet index point is transmitted to the dial pointer of the Testmaster through a lever and crown gear arrangement which is designed to reduce friction to a minimum. A hair spring takes up all backlash on gears. The dovetail slides located on the bottom edge and back end of the indicator together with a universal clamp are said to make setting of the Testmaster extremely easy and ensure rigid support.

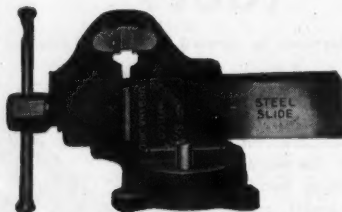
The Testmaster is equipped with a 1½-inch O.D. rotating dial which is available in four models; namely, Model 1 which is graduated in thousandths of an inch and has a range of 0.030 inch; Model 2 which is graduated in ten-thousandths of an inch and has a range of 0.008 inch; Model 3 which is graduated in hundredths of a millimeter and has a range of 0.8 millimeter; Model 4 which is graduated in five-thousandths of a millimeter and has a range of 0.2 millimeter.

## DESMOND GRINDING WHEEL DRESSERS and CUTTERS



We can supply you with the proper Dresser and Cutter for all of your grinding wheels. Ask for copy of our catalog and name of your nearest dealer.

## SIMPLEX Steel Slide VISES

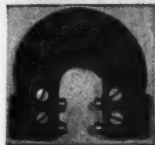


A full line of Machinists', Filers, Welders, Production and Drill Press and Milling Machine Vises. Let us send you our vise catalog and name of your nearest dealer.

**THE DESMOND-STEPHAN MFG. CO. -:- Urbana, Ohio**

# JOHNSON'S

## Adjustable Limit SNAP GAGES



MODEL A



MODEL B



MODEL C

Keep down your gage costs by using these fast, accurate gages. Reset when necessary.

Also: Flat and Cylindrical Plug Gages, Built-Up and Solid Snap Gages, Flush Pin and many other types of gages.

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IF YOUR WORK REQUIRES THE FINEST IN  
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**SPECIFY --**



Made in  
24 Different Sizes  
Up To 36" x 60"

Swanson Tool & Machine Corporation

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THE MARK OF QUALITY



SINCE 1919

# CRITERION Boring Heads

## CONSTANT ACCURACY...

Criterion Heads maintain original accuracy far beyond usual expectation. They are smooth, compact, rigid. Feature large graduated dial. Lead screw is hardened tool steel, with threads ground from solid after hardening, assuring constant accuracy. Parts subject to wear are hardened. Large offset adjustment eliminates need for offset boring bars. Two sizes: 1 1/2" and 1" . 1/2" and 1" bar capacity. Shanks are interchangeable, enabling operator to use head on different machines. Ideally adapted for slide boring tool holder on small turret lathes. Ask your dealer or order direct. Request literature.

Lead Screw  
ground from  
solid AFTER  
hardening.



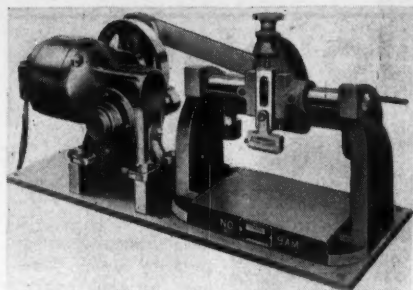
**C** RITERION MACHINE WORKS  
BEVERLY HILLS, CALIFORNIA

The Federal Testmaster Dial Indicator is furnished in a handsome plastic case, complete with  $\frac{1}{4} \times \frac{1}{2} \times 3$ -inch long holding bar, universal clamp, and instructions. Adapter rods for adapting indicator to surface and height gages or test sets which standard clamp and bar will not fit can be furnished on special order. Weight of indicator only,  $1\frac{1}{2}$  ounces.

### Acromark 9AM Power-Driven Marking Machine

Designated as the 9AM, a power-driven marking machine utilizing the arm and slide principle of marking is announced by The Acromark Co., 9 Morrell St., Elizabeth, N. J. The power unit of the machine is constructed so that it can be readily removed and added to standard hand-operated marking machines now in use by simply removing the hand lever of such machines and attaching the driving arm of the power unit.

Driving power is furnished by a  $\frac{3}{4}$  h.p. a.c. gear reduction motor which is designed to provide marking speeds of 9, 18, and 36 strokes per minute. A close-fitting guard for the driving gears is in-



Acromark 9AM Power-Driven Marking Machine

cluded as a part of the power unit. A guard covering both the driving gears and operating arm is available as optional equipment.

### G-E Three-Lamp Ballast

The General Electric Co., Schenectady, N. Y., announces a high-power-factor ballast which is designed for use in the operation of fluorescent lighting fixtures

## CATSKILL Abrasive Cut-Off Machine

*CUTS FASTER, SMOOTHER, STRAIGHTER*



**POWERFUL • ACCURATE • SAFE**

Cuts solids to 2" and tubing and shapes to 3"—cleanly—without secondary finishing operations.

### MODEL "W"

Cutting wheel runs in slotted pipe through which coolant is piped. This prevents surface hardening, burr and burn, and insures a smooth, finished cut.

WRITE FOR FOLDER

ON  
GEAR BLANKS  
DIE BLANKS  
TUBING  
EXTRUDED  
BARS  
CYLINDERS  
HIGH CARBON  
STEEL  
UNANNEALED  
STOCK  
PIPE  
AND MANY  
OTHER  
MATERIALS

**CATSKILL METAL WORKS, Inc.**  
CATSKILL, NEW YORK

**GRANT**

## RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to  $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles.

Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Stillman Ave. Bridgeport, Conn.

*MORE Designed and Built  
FOR Precision PLUS Production*

## VERTICAL SHAPERS

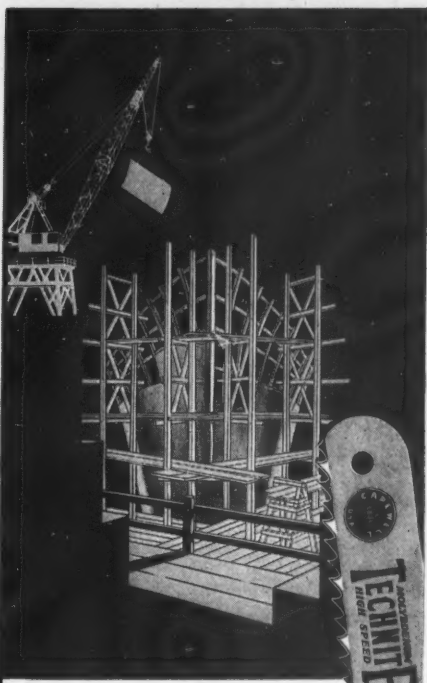
Four cutting Speeds . . . Infinite feed variations quickly selected . . . Directional control for all movements . . . Rapid power movements in all directions . . . Brake for Ram automatically applied... **OPERATOR CONTROLS MACHINE WITHOUT MOVING FROM HIS WORKING POSITION** . . . Timken Bearings for Bull Gear, Shaft and Rotary Table . . .

**ACCURATE, POWERFUL.  
FAST, FINGERTIP CONTROL**

Ask  
for  
Circular  
No. 728A



**MOREY MACHINERY CO., INC**  
410 Broome Street New York, N. Y.



## CAPEWELL wins new friends at SHIPYARD

An Eastern shipyard wanted a blade capable of standing up to accelerated production schedules. After a trial of Capewell's *Technite*, they have been using this hack saw blade regularly. How about learning what Capewell can do on *your* job? **THE CAPEWELL MFG. CO. HARTFORD, CONN.**

**CAPEWELL**

*THE TREND IS TO TECHNITE*  
THE MOLYBDENUM  
HIGH SPEED HACK SAW BLADE

having three 40-watt Mazda F lamps. Quickly and easily installed through the use of a minimum of wiring, the G-E



G-E Three-Lamp Ballast

Three-Lamp Ballast is available in types for operation on lighting circuits of 110-125, 199-216, 220-250, and 240-280 volts. Power factor is 90 per cent or above.

### Steelgrip Bearing and Battery Terminal Puller

Armstrong-Bray & Co., 5346 Northwest Highway, Chicago, Ill., announces the addition of the Steelgrip Bearing and Battery Terminal Puller illustrated herewith to its regular line of gear and

wheel pullers. The puller is made in two sizes designated as the Nos. 13 and 13A with 2 and 5-inch reach respectively.

The arms are constructed of drop forged, heat-treated steel of great strength. The hooks are made sufficiently thin so as to fit between bearings and motor housings and long enough to reach bearing races.



Steelgrip Bearing and Battery Terminal Puller

### Hunter-Hartman Portable Gasoline-Driven Generator

A portable gasoline-driven generator for rapid battery charging is announced by Hunter-Hartman Corp., St. Louis, Mo. The unit is said to eliminate many of the problems accompanying the use of storage batteries where electric current and conventional equipment for charging are not conveniently available.

The equipment is designed to charge 6, 12, and 24-volt batteries at 10 to 300

## ROCKFORD CLUTCHES

Enable Both Tanks and Sweepers to "Clean Up"



SEND FOR THESE HANDY BULLETINS ON POWER TRANSMISSION CONTROL



Show helpful application diagrams. Give capacities, dimensions and specifications. Describe and show space, time, labor and money-saving advantages of PULMORE CLUTCHES

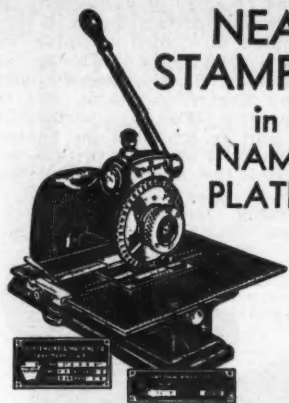


**Rockford Drilling Machine Division Borg-Warner**  
300 Catherine Street, Rockford, Illinois, U. S. A. Corporation

USE ROCKFORD INDUSTRIAL CLUTCHES FOR SUPERIOR PERFORMANCE AND ECONOMY

| Machine Tools | Process Machinery | Farm Implements | Materials Handling | Earth Movers | Service Machinery | Power Units |
|---------------|-------------------|-----------------|--------------------|--------------|-------------------|-------------|
|               |                   |                 |                    |              |                   |             |

Pullmore Multiple-Disc Clutches • Over-Center and Spring-Loaded Clutches • Power Take-Offs



## NEAT STAMPING in NAME PLATES

### Nameplate Detail Press

This machine quickly stamps details and serial numbers into name plates.

Write for Particulars

**GEO. T. SCHMIDT, Inc.**  
1806 Belle Plaine Ave. Chicago, Ill.

## U. S. HEADS

STANDARD SINCE 1913



Two Spindle Head  
Both Spindles  
Adjustable

**The United States Drill Head Co.**  
1954 Riverside Drive  
CINCINNATI, OHIO

## EXTRA STRENGTH Can Save Time and Labor

When three screws can do the work of four, five or more, they save drilling, tapping and assembling time and labor. They speed production and cut costs.

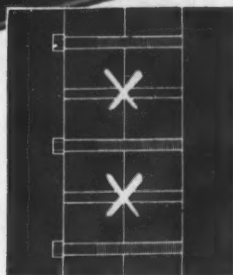
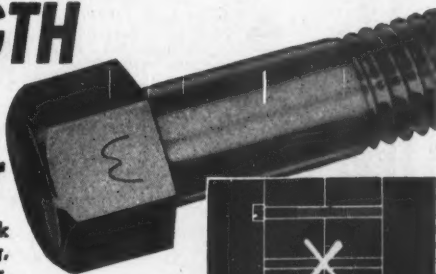
Mac-it Hexagon Head Cap Screws are heat-treated for maximum strength and toughness. This extra strength can be used to provide ample holding power with fewer screws.

The Mac-it "m" on the hex head is your guarantee of quality. It appears on all diameters 1/4" to 3/4", inclusive.

### OTHER MAC-IT PRODUCTS INCLUDE:

Hexagon Socket Cap Screws, Hollow Set Screws  
Hollow Pipe Plugs, Stripper Bolts  
Square Head Set Screws

**STRONG, CARLISLE & HAMMOND CO., Cleveland, O.**



4331

**Mac-its**  
PRONOUNCED  
"MAC-IT"

## "THE TAP- OF-THE-YEAR"

From a highly specialized plant in Greenfield, Massachusetts have been shipped hundreds of thousands of taps since Pearl Harbor. On each has been stamped the maker's name . . . "Threadwell".

These high-speed taps have gone onto hundreds of production lines that had never heard of "Threadwell" Taps before the war. And from these users of Threadwell Taps have come words of appreciation . . . for their stamina, accuracy and performance . . . for their rust-proof finish . . . for their "dot" system of easy identification . . . for the modern transparent plastic containers in which ground thread taps are shipped . . . and for the cooperation from Threadwell distributors in expediting orders and shipments. In the minds of many such users . . . the Threadwell Tap is indeed the "Tap-of-the-Year".



EXPORT STOCKING DISTRIBUTORS  
CANADA: Bridge Machinery Co., Montreal  
ENGLAND: Styler Ltd., London

# Threadwell

"TAPS OF DISTINCTION"

THREADWELL TAP AND DIE CO., GREENFIELD, MASS., U.S.A.

amperes, and consists of a specially designed generator driven by a 6 h.p. single cylinder air-cooled gasoline engine which is equipped with an air cleaner, gasoline filter, magneto, self-starter, rope starter, gas tank, and remote stop control. For easy portability, the entire unit is mounted on a skid-type base which is equipped with 5-inch wheels. When the unit is in use, the wheels may be raised from the ground, thus preventing creeping.

The Hunter-Hartman Portable Gaso-



**Portable  
Gasoline Engine  
Driven Generator**

Hunter-Hartman Portable Gasoline-Driven Generator

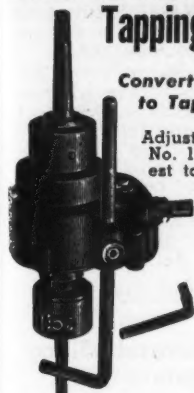
line-Driven Generator is said to be particularly useful in airplane factories and around airports for starting motors as well as charging batteries. According to the manufacturer, the unit can also be used as a direct current lighting plant with output range from 1,000 to 3,000 watts as required.

## Hilco Portable Oil Filter

The illustration herewith shows the Hilco Portable Oil Filter which is now being manufactured by The Hilliard Corp., 374 W. 4th St., Elmira, N. Y. The unit consists of a standard Hilco Hyflow oil filter and a small gasoline engine which drives a rotary pump that forces the unclean oil through the filter. The exhaust gas is passed through a jacket

## Dorman Automatic Reverse Tapping Attachments

Convert Your Drill Presses to Tappers in 2 Minutes



Adjustable Friction Drive  
No. 1 Tapper drives smallest tap in softest material to  $\frac{3}{8}$ " tap in steel. Simple adjustment changes from light friction to positive drive or any intermediate stage.

DELIVERY  
PROMPT

No. 2 Tapper Drives from  $\frac{1}{2}$ " to  $\frac{3}{4}$ "  
No. 3 Tapper Drives from  $\frac{1}{2}$ " to 1" in steel or other material.

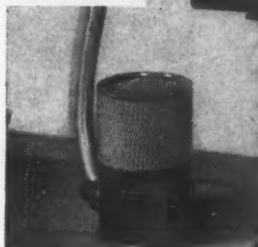
Write for details.

### Dorman Machine Tool Works

357 Canal St.

New York, N. Y.

## STOP



## DUST

from Grinders with **DUSTKOP**

Model 600 DUSTKOP is quickly attached to any tool, cutter, surface or internal grinder . . . Operated by  $\frac{1}{4}$  hp GE or Howell motor and fan . . . Spun glass, Drum-Type Filter stops dust and returns cleaned air to room . . . LOW priced.

Write for Bulletin.

**AGET-DETROIT CO.**

2046 Beak Bldg. CADILLAC 3090 Detroit, 26

## Mead BURRING MACHINE

INDUSTRY'S JACK - OF - ALL - TRADES

**Also Works On Inside Cut-Out Openings!**

Serving a swiftly-growing number of America's important Defense Contractors. For that trouble-some grinding or finishing job, try the Burring Machine. If it doesn't help you, it won't cost you a cent! There is not one industrial plant in America where this machine—somewhere along the line—cannot be helpful. Tool-room, template department, production line, or elsewhere—this Burring Machine will find its place. Try it at our expense. Immediate delivery in most instances.

### TYPICAL Burring Machine JOBS

De-burring stampings and other small parts. Removing "flash" from forgings and die-castings. Grinding cutters and tools. Cleaning up irregular edges. Smoothing and polishing metals of all kinds.

### MEAD SPECIALTIES CO.

15 S. MARKET ST.

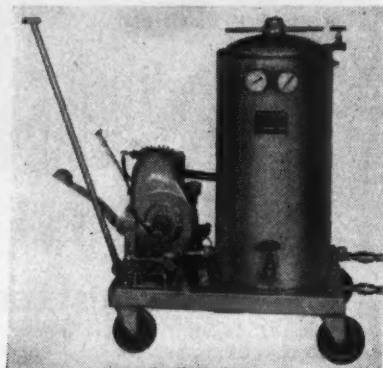
Dept. 83-A

CHICAGO



around the filter so as to heat the filter unit.

Readily portable, thereby enabling it



Hilco Portable Oil Filter

to be used in any desired location, the Hilco Oil Filter is said to be suitable for filtering many types of oils, including those employed for lubrication purposes and general use in Diesel engines,

gasoline engines, steam turbines, steam engines, locomotives, vacuum pumps, hydraulic presses, and air compressors; as well as insulating oils, such as those used in transformers and circuit breakers. Filtering of fuel oils is also said to be successfully accomplished.

To use, the Hilco Portable Oil Filter is simply wheeled up to the equipment containing the oil which is piped to the filter inlet, purified, and returned to the equipment. This same work can also be accomplished by installing a dirty oil and clean oil tank. The unit is available in sizes with capacities ranging from one gallon per minute up to several hundred barrels per hour, depending upon the type of fluids to be filtered.

### Grayson-Kennametal Milling Cutters

The McKenna Metals Co., 300 Lloyd Ave., Latrobe, Pa., has taken over the direct sales, engineering, and service of Grayson - Kennametal Milling Cutters. These cutters, which are made with sturdy bodies of Meehanite tipped with Kennametal, will be distributed and serviced by the sales organization of the



## ASSAULT BOATS for example...

Special cold-forged metal parts for assault boats are made on equipment used regularly in the manufacture of HASSALL *special* nails, rivets and screws. Thousands of similar examples. Decimal Equivalents Chart Free.

**JOHN HASSALL, INC.**

Established 1880

394 Oakland Street

• Brooklyn 22, N. Y.



## THE MODERN SURFACE PLATE

OF



MARBLE

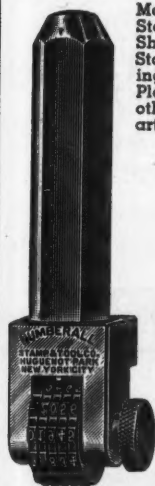
- Does not distort
- Will not rust
- Non-magnetic
- Reasonably priced

Made in all sizes with surface tolerance of .001" or .0003".

**STANDARD MARBLE WORKS INC.**  
242-246 JAVA ST. BROOKLYN, N. Y.

Established 1901

## Mark It Quickly with a **NUMBERALL**



Made with 1 to 10 wheels.  
Stamp in perfect alignment.  
Shank for Hand or Press  
Stamping. Platform for stamp-  
ing Name Plates and other small  
articles.



No. 45  
Platform

**NEW Quick Set Machine.** One wheel can be turned quickly by knurled knob for consecutive numbering.

**NUMBERALL STAMP  
& TOOL CO.**

Huguenot Park,  
Staten Island, N. Y.



'STEP-UP'  
GRINDING  
SPEED

## DUPLEX M-6 BAND AND DISC GRINDER

The latest in pedestal type grinders. Actually two machines in one! 14" disc for all rough work... 6 x 48" band for finishing. Precision-built to meet war-time production standards — quickly, economically!



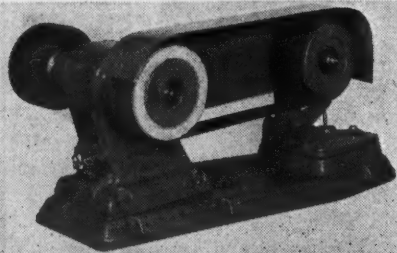
**STANDARD  
D-4  
Abrasive  
Band Grinder**

This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4 x 36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW  
BOOKLET ON FINISHING—WRITE TODAY

**WALLS SALES CORP.**  
96 Warren St., New York, N. Y.

# **JONES BENCH GRINDER** and Polishing Machine No. 135



**Gives You Faster,  
Better Finishes—  
At Lower Cost,  
Too!**

The Jones Bench Grinder and Polishing Machine No. 135 finds unlimited use for deburring and polishing around the shop, or for production work on small parts. The new one-piece base eliminates any misalignment.

Check these Jones features: Can be used with any type  $\frac{3}{4}$  to 2 H.P. motor . . . Perfect belt tension and alignment . . . Dustproof motor mounting . . . Easy operation.

Write for Bulletin No. 135 today.

**JONES ENGINEERING  
COMPANY**

DEPT. B-2  
ELLWOOD CITY, PENNSYLVANIA

McKenna Metals Company.  
Grayson-Kennametal Milling Cutters can be used for the rapid and accurate face milling, end milling, slot milling,

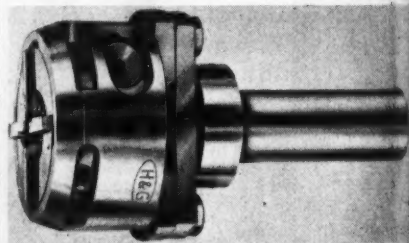


Grayson-Kennametal Milling Cutter

and straddle milling of workpieces and are available with three grades of cutting tips; namely, grade KM for milling steel, grade K2S for rough milling of cast iron, and grade K4H for milling aluminum-silicon alloys, magnesium-aluminum alloys, brass, bronze, and non-ferrous materials.

## **H&G Style SAML Solid Adjustable Insert Chaser Die Head**

Designated as the H&G Style SAML, a solid adjustable insert chaser die head which is especially designed for use on



H&G Style SAML Solid Adjustable Insert  
Chaser Die Head

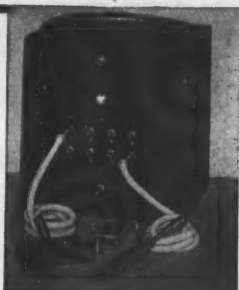


## STOP DUST with Model 1250 DUSTKOP

for big-wheel Carbide Tool, Surface and Disc Grinders, Sanders, Cut-Offs —Gets all the dust. Quickly installed. GE 1½ hp continuous duty motor sends dirty air through cyclone separator, returns cleaned air through filter to working space. Write for Bulletins.

**AGET-DETROIT CO.**  
2046 Book Bldg. Cadillac 3090 Detroit, 26

## MARK IRON, STEEL and CARBIDES



THE  
*Etchograph*  
WAY

**Original Electric Etcher. 3000 in Daily Use**  
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements. • Also a combined Etchograph and Demagnetizer.

• Write for circulars and prices.

**BREWSTER-SQUIRES CO.**  
40 CHURCH ST. NEW YORK

# BUILDERS' T' SURFACE GRINDER

A full 10" vertical capacity from table top to bottom of 7" wheel permits surfacing numerous items previously handled only on large expensive machines.

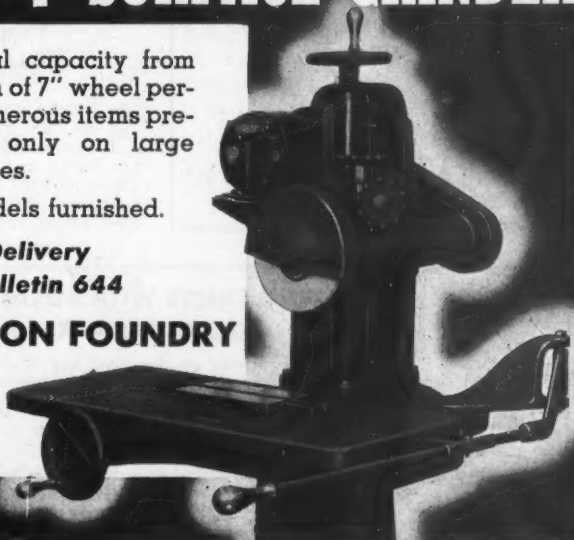
Bench or floor models furnished.

**Prompt Delivery**  
**Send for Bulletin 644**

**BUILDERS IRON FOUNDRY**

**19 Codding St.**

**Providence,  
R. I.**



all sizes of Brown & Sharpe automatic screw machines is announced by The Eastern Machine Screw Corp., Truman and Barclay Sts., New Haven, Conn. The head is available in various sizes, the No. 00 size with range from 0 to  $\frac{3}{8}$  inch being designed for the No. 00 B & S automatic screw machine. The 0 to  $\frac{1}{2}$ -inch and 17/32 to  $\frac{3}{4}$ -inch sizes are designed for the No. 0 B & S, and 25/32 to 1-inch and  $1\frac{1}{2}$  to  $1\frac{1}{4}$ -inch sizes for the No. 2 B & S. The various size heads may be used on larger machines than indicated by bushing the shanks. The No. 00 size and the  $1\frac{1}{2}$  to  $1\frac{1}{4}$ -inch size are slabbled slightly on one side to clear

the machine for which they are designed.

The H&G Style SAML Solid Adjustable Insert Chaser Die Head is supplied complete with holder and is provided with an alignment feature to take care of misalignment of turret and spindle. Insert chasers are made of high speed steel and are easily removable for re-grinding.

The Style SAML head is extremely light in weight, relatively small in diameter, and rather short. The head is adjustable for size and, when once adjusted, is said to hold that size. Since it has no moving parts, maintenance is reduced to a minimum.

# ROTARY FILES



HAND CUT

**CUT TIME** **ALL SHAPES**  
Cuts & Sizes

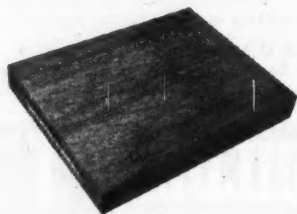


*Write for Catalog*

**MECHANICAL DIE & TOOL CO. Inc.**  
11 New York Ave. Brooklyn, N. Y.

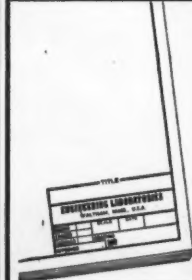
## Standard Marble Surface Plate

The accompanying illustration shows the Standard Marble Surface Plate which is now being offered by Standard Mar-



Standard Marble Surface Plate

ble Works, Inc., 242-246 Java St., Brooklyn, N. Y. The plate, which is claimed will not warp or become distorted, rust or stain, and is non-magnetic, is made of a special marble of very close texture and density which is said to possess a compressive strength of 17,077 lb.



### TRACING SHEETS WITH BORDER AND UNIVERSAL TITLE BLOCK—Always In Stock

Perfectly printed on our 100% rag Waco Tracing Parchment. A white untreated paper guaranteed permanent. Will not deteriorate or lose transparency. Will make clear sharp prints. Make your drawing in pencil then ink the lines. You pay a draftsman at least 50¢ to draw and letter a title block and border. Why not pay only 1/10 for sheets all ready to work on! They're distinctive, too!

Special forms printed to order. For other "Wade" drafting papers and instruments see our catalogue-folder in your file or write.

**WADE INSTRUMENT CO.** 1422 E. 109th St., Cleveland, Ohio

**GEARS of known EFFICIENCY**



**Abart GEARS**

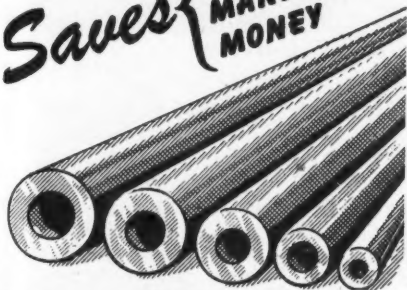
Abart Gears have records of years for precision—high sustained efficiency—dependability. *Any material. No stocks.* Send B/P or specifications for estimate.

**ABART SPEED REDUCERS**—Wide selection worm and spur gears. Send for Catalog.

**Abart** GEAR AND MACHINE CO.  
MANUFACTURERS OF  
Speed Reducers & Gears  
4810 WEST 11TH ST. CHICAGO, ILLINOIS

## TOOL STEEL TUBING

*Saves* { **TIME  
MANPOWER  
MONEY**



### Normally in Stock

N.E. Steels and Standard S.A.E. Steels, both Carbon and Alloy, Hot Rolled and Cold Drawn •  
Chisel Steels • Cumberland Ground Shafts •  
Drill Rod • High Speed Tool Bits • Shim Steels  
• Tool Steels • Boiler Tubing •

**BISSETT Steel**

945 E. 67TH STREET CLEVELAND OHIO HENDERSON 0495

## REVOLVATOR

Reg. U. S. Pat. Off.

## HYDRAULIC ELEVATORS



*This Ramp Eliminator type saves time and trouble in moving material between basement and street levels. Similar short lift REVOLVATOR HYDRAULIC ELEVATORS are being used to feed paper and metal sheets to presses.*

## SAFE -- SIMPLE -- SURE

Best and most economical type of elevator for most short lifts. Built to fit **your** requirements they assure you satisfactory and dependable service. Specify REVOLVATOR HYDRAULIC ELEVATORS when building; modernizing; replacing.

Send for new Bulletin MM, with dimension diagram.

Investigate also our famous REVOLVATOR  
**PORTABLE ELEVATORS and RED GIANT  
LIFTRUCKS.**

**REVOLVATOR Co.**

DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT

2024 86th St., NORTH BERGEN, N. J. Since 1904

per square inch. The plate is available with polished or honed surface with fineness of 0.001 inch or greater, and has a slightly rounded top edge as well as two concealed grooved grips to facilitate handling.

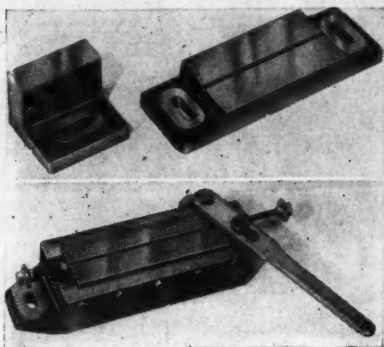
The Standard Marble Surface Plate can be made in any desired dimensions and can be resurfaced if necessary. Plates with or without grooves and with smooth, hone finished surfaces can also be used for certain types of lapping.

### Rouse Fixture Set-Ups

In order to make the Rouse Hand Miller fully productive on short notice, the manufacturer—H. B. Rouse & Co., 2214 N. Wayne Ave., Chicago, Ill.—has made available several fixture set-ups, use of which is said to greatly reduce the preliminary tooling usually necessary in making the completed fixtures.

The accompanying illustration shows an angle plate set-up with  $\frac{1}{8}$ -inch keyway on the bottom surface, and a flat set-up with  $\frac{1}{8}$ -inch keyway on bottom and  $\frac{1}{8}$ -inch keyway on top, thus allowing for adjustment from front to back and sideways. The unit shown at the

bottom of the illustration is a stationary base plate with sliding table. The base plate has a  $\frac{1}{8}$ -inch keyway on the bot-



Rouse Fixture Set-Ups

tom. The sliding table has adjustable stops at both ends and a range of movement of  $3\frac{1}{2}$  inches which is obtained by lever feed. The movement is provided with means for adjustment from left to right.



- ◀ Special Anti-Mushrooming
- ◀ Anti-Chipping Heat-Treat
- ◀ Oversize Shanks
- ◀ Exclusive Knurled Back
- ◀ Exclusive Thumb Grip
- ◀ Broach-Rounded Corners

**A Complete Engineering Service on Marking Devices**

Write for Price and Data Bulletin No. 113-12

**NEW METHOD STEEL STAMPS, Inc.**  
149 Joseph Campau, Detroit

## Vernon accessories

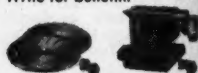
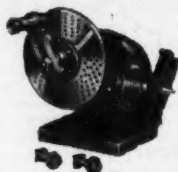
### VERNON 7" ROTARY TABLE

Precision ground top and bottom—Substantially ribbed. 4 table quadrants calibrated 0 to 90° each. Friction loaded worm dial graduated in 240 minutes. Overall height 2 $\frac{3}{4}$ ". Free folder!



### VERNON 6" UNIVERSAL INDEX CENTERS

Head swivels and locks from 10° below horizontal to 10° past perpendicular. Spindle taper No. 9B&S. The 3 index plates provided will divide all numbers to 50 and all even numbers to 100 (except 96T). Write for bulletin.



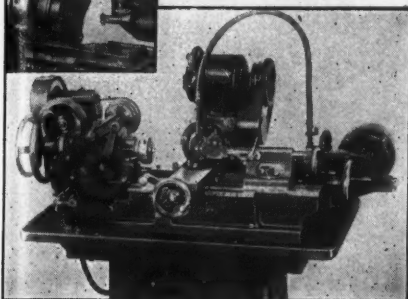
MACHINERY MANUFACTURING COMPANY  
Vernon Line of HORIZONTAL MILLS, VERTICAL MILLS and 210 BORES, SHAPERS and GRINDERS

## For Threading Small Parts

The WALTHAM Thread Miller will cut V, N.S., Acme, Whitworth and Metric threads, special threads . . . up to 2" diameter. (Insert below shows special head for internal threading.) Special head for relieving can also be furnished.



Write for new  
bulletin No. M



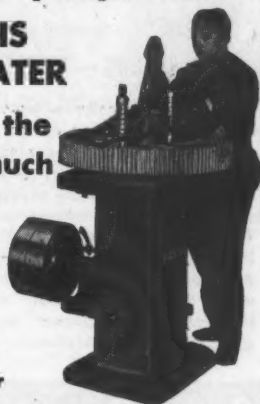
WALTHAM MACHINE WORKS, Waltham, Mass.

## Why Use A Shaper to cut Keyways when a

**DAVIS  
KEYSEATER**

will do the  
job so much  
quicker  
and  
better?

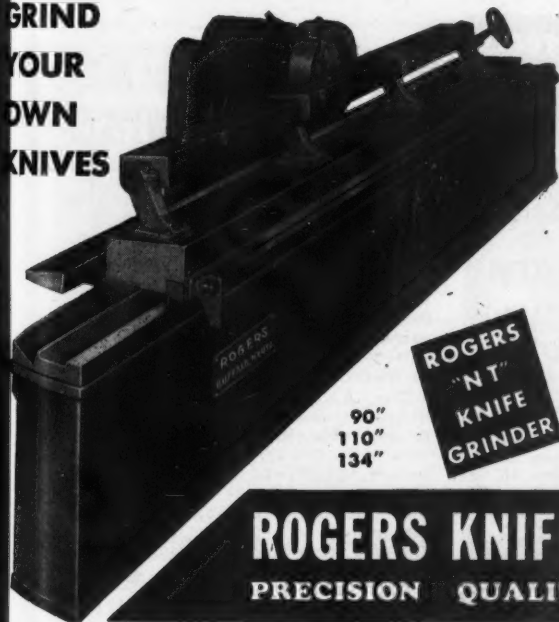
Send  
for  
Circular



**DAVIS KEYSEATER CO.**

Exchange and Glasgow Sts.  
ROCHESTER, N. Y.

## GRIND YOUR OWN KNIVES



90"  
110"  
134"

**ROGERS  
"NT"  
KNIFE  
GRINDER**

## HELP SPEED PRODUCTION

Knives last longer . . . cut more keenly, more smoothly . . . when sharpened on this heavy-duty ROGERS precision knife grinder. Requires no skilled operator . . . built for steady 24-hour service.

Send for NT Circular; give maximum length of knives.

**Samuel C. Rogers & Co.**  
213 Dutton Ave., Buffalo, N. Y.  
Also manufacturers of circular knife and band saw sharpening equipment.

**ROGERS KNIFE GRINDERS**  
PRECISION QUALITY SINCE 1887

## Gear Specialties

**SPURS — HELICALS** (14 to 96 D.P.)

**BEVELS** — (straight and spiral)

**WORM GEARING — THREAD GRINDING**

This range logically embraces the gear components of many critical control devices essential to the war effort and this organization is proud of its contributions of such material in the program.

With full production capacity scheduled far into the future, all new inquiries are now necessarily subordinated to these vitally important prior commitments. However, every urgent need will be given careful consideration.

## Gear Specialties



CHICAGO



## CRITERION Diamond TOOLS



**STEADY PRODUCTION**

Dependable diamond tools are vital in present production schedules. Every day more users are turning to Criterion Diamond Tools for the kind of service which they must have. Quality of diamonds used plus a unique method of setting assures extreme rigidity and extra tool life. Special tools made to order following blueprints or specifications. Sharp-pointed, selected thread grinding tools. Order direct. Request literature.

## CRITERION

MACHINE WORKS  
BEVERLY HILLS, CALIFORNIA

## Atkins High Speed Steel Metal Saw

E. C. Atkins & Co., 466 S. Illinois St., Indianapolis, Ind., announces the high speed steel metal saw shown herewith.



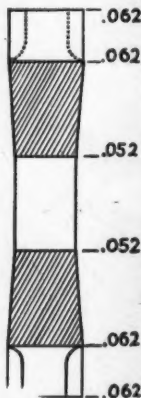
Atkins High Speed Steel Metal Saw  
for Extreme Accuracy

Originally designed for slotting super-charge wheels, the saw can be readily adapted to many other kindred sawing operations on ferrous and nonferrous metals where accuracy is a first requirement.

The saw is made 0.062 inch on tooth edge and 0.052 inch at mandrel. Each tool has a relief ground at the back to the depth of the gullet which is said to allow for sufficient clearance where tolerances as close as 0.0002 inch must be maintained.

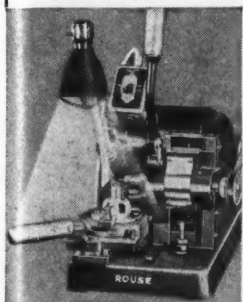
The Atkins High Speed Steel Metal Saw is available in diameters of 3, 4, 5, 6, and 8 inches, which will make it applicable for use on most standard milling machines.

Made from an excellent grade of high speed steel, the saw is tempered to meet the need for fast, accurate production.



Cross Section  
Drawing of Atkins  
High Speed Steel  
Metal Saw

## The LIGHT That "Gets Around the Corners"



Fluorescent lighting with all its advantages, doesn't always provide the close-up, exactly focused illumination so often needed for precision work.

VIMCOLIGHT directs a concentration of light... glare-

less, clear, restful... where the operator needs it for fast, error-proof production. Write for circular.

# VIMCOLIGHT

VIMCO MANUFACTURING CO.  
111 CHENANGO ST. BUFFALO, N. Y.

## Step Up War Production with

# REED PRECISION-MADE KNURLS



Wide range of popular sizes and patterns in stock for prompt delivery.

**Send for Knurl Selector Table and Catalogue No. 61-1141**

REED SMALL TOOL WORKS

WORCESTER, MASSACHUSETTS

## NEW BOOKLET Describes LIGHTWAVE MEASUREMENT



**IT'S YOURS FOR THE ASKING!**

Just off the press... Acme's new booklet "SHOP MEASUREMENTS to one millionth of an inch," describes in simple detail how Acme Optical Flats are applied in the procedure of lightwave measurement.

Illustrations and diagrams show how these flats can be used to check surface flatness, as well as their use for accurate comparison measurement in connection with precision gage blocks.

In short, this new booklet has been written in non-technical terms to make it easy for the average mechanic to thoroughly understand how to apply lightwave measurement in shop practice.



Write for Your Copy Today . . . !



# ACME INDUSTRIAL COMPANY

Makers of Standardized Jig and Fixture Bushings  
212 N. Laflin St. Chicago, Ill.

MONroe 4122

## Barber-Colman Micropositioner

Designed primarily for aircraft service, a polarized direct current voltage sensitive relay known as the Micropositioner has been brought out by the Barber-Colman Co., 207 Loomis St., Rockford, Ill. The unit can be used for remote positioning of control motors, the control of air valves, engine cowling flaps, and trim tabs, and similar aircraft installations.

The contact tongue of the Barber-Colman Micropositioner is positioned by means of a balanced armature. The



Barber-Colman Micropositioner

construction is such that the effect of vibration is said to be reduced to a minimum. The entire operating mechanism is mounted on a bakelite base and is enclosed in a transparent Lucite case which provides for convenient contact inspection without removal of the cover.

Specifications of the Barber-Colman Micropositioner are as follows: sensitivity, 0.10 volt, 0.002 amp.; contact rating, 0.5 amp. at 28 volts (non-inductive load); weight, 6 ounces.



## DICKERMAN

### Height Gauge

**Comparator or Scriber**

A rigid tool, giving settings to ten thousandths. One complete turn of adjusting thumb screw moves indicator holder less than six thousandths of an inch, without backlash. Heavy base and substantial 10" column.

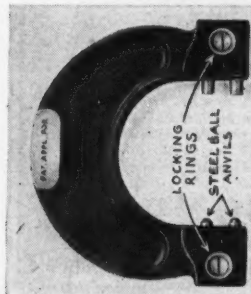
*Write for folder illustrating wide range of jobs handled.*

**H. E. DICKERMAN**  
**MFG. CO.**

321 Albany St.  
SPRINGFIELD,  
MASS.

## Ross Air Speed Control Valve

An air speed control valve which is designed to provide and maintain accurate split-second timing of piston movements is announced by the Ross Operating Valve Co., 6484 Epworth Blvd., Detroit, Mich. With full capacity air flow at both intake openings, the valve is adjustable so that speed of air flow in



## ADJUSTABLE SNAP GAGES IN STOCK Model A

Immediate delivery .025" to 4 1/4"

## PROMPT DELIVERY ON PLUG GAGES .125" to 8"

Extraordinary Improvement in Adjustable Snap Gages with Ball-tipped anvil and amazing positive locking system cannot get out of set—Pat. Appl'd for.

**GOOD GAGES** Prevent Spoilage Speed-Up Operations Utilize Less Skilled Help Reduce Costs

## EASTERN PRECISION GAGE CO.

HERSH TOWER BLDG., BROAD ST.  
Phone, Elizabeth 2-9519

ELIZABETH, N. J.



## 7 ADVANTAGES of the TEMCO Electric Furnace

- 1 Rugged one-piece body; snug fitting door.
- 2 Quality Nichrome heating element embedded in reinforced muffle — minimizes oxidation.
- 3 Heavy - duty switch, monel metal contacts; 3-range heat selection.
- 4 Rapid heating to max. temp. in but 30 min. Operates continuously to 1500° F.; intermittently to 1850° F.
- 5 Entire heating element used over full heating range and covers 4 sides of chamber—eliminates cold spots.
- 6 Accurate, dependable pyrometer calibrated in both Centigrade and Fahrenheit scales assures uniform results.
- 7 Low in cost; economical in operation. Ideal for heat-treating small metal parts and for testing and development. Heat chamber 4" wide, 3 3/4" high, 3 3/4" deep. Outside dimensions 9" wide, 13 1/2" high, 10" deep. Available in 115 and 230 volts. Send for descriptive bulletin. \$42.50 (115 Volts)

**THERMO ELECTRIC MFG. CO.**

488 W. Locust Street

Dubuque, Iowa



**Machined Jobs\*  
are NOT Complete without  
DY-NAMIC BALANCING**

\* **Rotating Parts** must be Dy-Namically Balanced, if they are to be free from the destructive couple-force vibrations that cause premature wear, reduced efficiency, and increased maintenance cost.

Now Dy-Namic Balancing has been made easier, faster, lower-cost—due to the new Bear Dy-Namic Balancing techniques and low-cost machines. Leading Manufacturers employing Bear Precision Dy-Namic Balancing report accuracy to Government specifications resulting in smoothness and efficiency impossible with products that are not in Dy-Namic Balance.

WIRE, PHONE or WRITE details of your balancing problem, or write for FREE DATA BOOK describing the many Bear Dy-Namic Balancing Machines available to those with war industry priorities. Address Bear Mfg. Co., Industrial Division, Dep't MMS, Rock Island, Illinois.

## Reduce Sharpening

**Costs**

**50 to 90%**

No. 57T Automatic Metal Saw Grinder automatically sharpens metal saws in gangs up to 8" in diameter.

Takes gangs up to 3 1/2" thick. Automatically indexes and sharpens within variation of plus or minus .001 of exact diameter of entire lot. Also handles other special work such as reamers, cams, etc.

Write for Folder 57T.

**THE WARDWELL MFG. CO.**

3166 FULTON ROAD

CLEVELAND, OHIO



**BEAR**

**DY-NAMIC BALANCING MACHINES**

• In One Operation Shows Static, Dy-Namic and Static Dy-Namic.

• Micrometer Dials—Calibrated to approximate quantity of correction.

• Adjustable Bed—Permits balancing of many sizes and types of bodies on one machine.

## HEAVY BEVEL



## SAFETY (Reg. Trade Mark) LETTERS and FIGURES

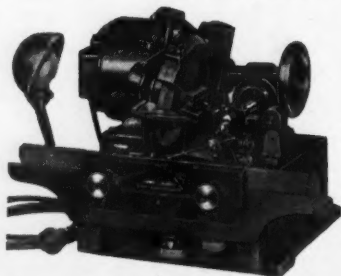
Deeper, clear impressions. Will not spall, will not mushroom. Any size character from 1/32" up.



## Higher Production from SHARP TOOLS

The Howe Lindsey Automatic Sharpener will keep your hack, band or slitting saws sharp at a minimum expense. Can also be used as a cutting-off machine on wire, etc.

**Howe & Son, Inc., Hinsdale, N. H.**



one direction can be controlled over an unusually wide range. Adjustment of valve for air speed is effected through a vernier-like mechanism. A specially de-



Ross Air Speed Control Valve

signed stem and floating bevel seat poppet provide for maintenance of positive steady control of any selected air speed.

## Gebauer's Tannic Spray

As a means of reducing man-hour loss from industrial burns, The Gebauer Chemical Co., Cleveland, Ohio, has prepared a tannic acid solution which is marketed under the name of Gebauer's Tannic Spray. According to the manufacturer, the solution is stable, antiseptic, and forms a tannic film over the area to which it is applied, thus greatly reducing the probability of blister formation, infection, and so on.

The bottle in which the solution is supplied is unique in that its closure is an automatic device which permits the solution to be sprayed directly from the bottle over the affected burn area.

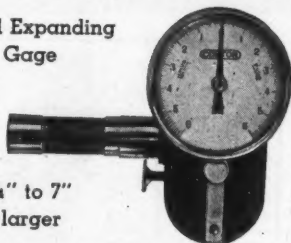
## Cherry Rivet G15 Power Gun

Offered by Cherry Rivet Co., 231 Winston St., Los Angeles, Cal., the Cherry

Use MODERN gaging  
for precision bores!

## COMTORPLUG

Patented Expanding  
Internal Gage



Sizes:  $\frac{1}{4}$ " to 7"  
dia. and larger

Comtorplug solves the problem of obtaining more precise tolerances with less skilled help. Its automatic accuracy enables learners to gage to fractions of .0001" with precise results. Shows size, front or back taper, out-of-round, barrel shape, bell mouth, etc. Widely used for inspection.

REQUEST BULLETIN 29

**THE COMTOR CO.**

64 Rumford Ave.

Waltham, Mass.

## ALL THESE PATTERNS WITH STRAIGHT KNURLS



### GRAHAM KNURL HOLDER FITTING LATHE TURRET

One pair of straight-cut knurls will make an endless variety of patterns when used in our adjustable Knurl Holder. Handles work up to  $2\frac{1}{2}$ " dia. Shank individually made to fit your turret.

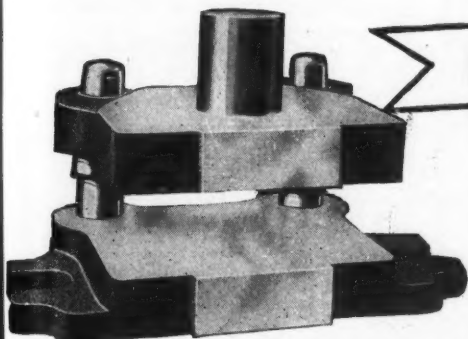


Request Illustrated Price Circular

**GRAHAM MFG. CO.**

33 BRIDGE ST.

EAST GREENWICH, R. I.



# PRODUCTO

## DIE

## SETS

Accuracy and interchangeability make it easy for the tool and die maker to use Producto Die Sets. Hundreds of combinations available. Standard and Special Sets without delay.

In addition to addresses below, service also from Die Supply Company, Cleveland, Ohio; Jamison Steel Corp., San Francisco and Los Angeles, California.

Die Makers' Accessories also in stock at all points.



*The* **PRODUCTO  
MACHINE COMPANY**

3017 MEDBURY AVE., DETROIT, MICH.

990 HOUSATONIC AVE., BRIDGEPORT, CONN.

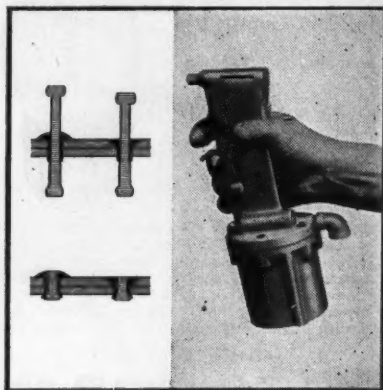
Rivet G15 Power Gun illustrated herewith is designed for the high speed application of Cherry blind rivets in double surfaced structures where access to one side of the work is obstructed. According to the manufacturer, tests indicate that Cherry rivets can be installed at a rate of 1,600 per hour with this gun.

An all-pneumatic gun, the G15 incorporates a minimum number of parts, is smooth acting, and well balanced. Cast aluminum, steel, and bronze are used in the construction of the gun, which is designed for connection to standard  $\frac{1}{4}$ -inch air lines of 75 to 100 lb. per square inch pressure.




**CONTINUOUS HINGES**  
 Manufactured by  
**AUTO MOULDING  
 & MFG. CO.**  
 2326 S. CANAL ST. CHICAGO  
 WRITE FOR STOCK LIST

The Cherry Rivet G15 Power Gun is supplied with three interchangeable pulling heads for handling the three standard diameters of Cherry rivets— $\frac{1}{8}$ ,  $\frac{3}{16}$ , and  $\frac{1}{4}$  inch either hollow or self-plugging types. Clearance around the rivet axis is  $\frac{3}{16}$  inch. According to the manu-

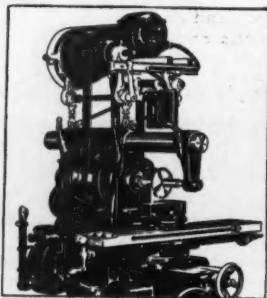


Cherry Rivet G15 Power Gun

facturer, the gun operates equally well in any position. Overall height of gun is 10 $\frac{1}{2}$  inches, and maximum diameter is 3 $\frac{1}{2}$  inches. Weight, approximately 4 $\frac{1}{2}$  pounds.

### Cramer Percentage Timer

A timer which automatically controls the percentage of time at which any a.c. circuit can be periodically closed or opened out of a definite length of a time cycle has been made available by The R. W. Cramer Co., Inc., Center-

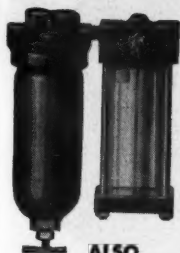


### The drive that stays in service.

A "short" in a motor can't "gum up" production from a machine tool equipped with a Remco Drive. Simply unbolt and remove the dead unit and substitute another motor—a matter of minutes. Only the Remco Drive has a patented universal motor mounting which takes any motor of reasonable size—new or USED. Nothing else like it! Write . . . Remco Products Corp., State and Hay Sts., York, Pa.

**REMCO MOTOR DRIVES**  
 for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

• **M - B** •  
**AIR-LINE FILTER**  
 and **AUTOMATIC**  
**LUBRICATOR**



**ALSO  
 PORTABLE  
 PNEUMATIC  
 GRINDERS**

**Removes 96%  
 to 97% of All  
 Water, Dirt and  
 Scale from Airline.**

Air passes through a series of brass discs with .002 spacings, providing the finest degree of filtration obtainable by any known method. Then, as the air passes through head of Lubricator, oil is delivered into the purified air line in any desired volume.

**Write for Literature**

**M-B PRODUCTS**

138 E. LARNED ST. DETROIT MICH

EXPORT OFFICE  
 44 WHITEHALL ST.  
 NEW YORK, N.Y., U.S.A.

**For many types of holding on  
 a variety of machines**



**Sold  
 plain  
 or with  
 jig  
 attach-  
 ments**

**GRAHAM MULTI-PURPOSE VISE**

The flush, parallel and square construction of this vise, plus positioning stops, guides, special jaws and other attachments, enables you to hold a wide variety of work for either single or repeat operations on drill press, radial, miller, planer, shaper, grinder, etc.

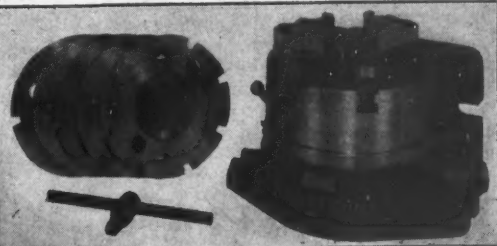
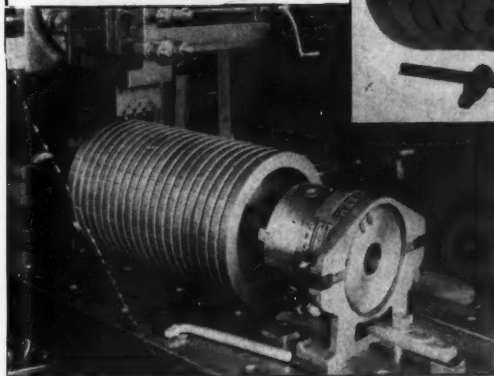
**Request Illustrated Price Circulars**

**GRAHAM MFG. CO.**

33 BRIDGE ST.

EAST GREENWICH, R. I.

**HARTFORD**



**The Versatile**

**“ SUPERSPACER ”**

• The HARTFORD “Superspacer” can easily be set up for one piece or thousands.

*At left:* an unconventional but simple and logical set-up for planing the graduation lines on cast iron drums . . . in a fraction of the time formerly required by milling.

Interchangeable mask plates make errors impossible on divisions of 2, 3, 4, 6, 8, 12 and 24.

**WRITE FOR FOLDER.**

**The Hartford Special Machinery Co.**

HARTFORD

CONNECTICUT

August, 1943

MODERN MACHINE SHOP

321

brook, Conn. The timer is said to be particularly designed for use in regulating any input to electrically-operated furnaces, oven, or heaters; controlling the proportionate flow of chemicals for boiler feed water treatment, and so on.

The Cramer Percentage Timer has a self-starting synchronous motor which drives a cam-operated switch mechanism through the medium of an enclosed gear train. The percentage of operating time is a function of the motor-driven cam in relation to a similar stationary cam fixed to a calibrated dial. Varying the position of the stationary cam alters

the relation between the contact mechanism and opens and closes it a definite percentage of the total cycle as indicated on the dial.

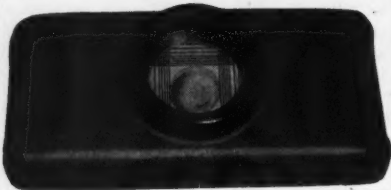
The Cramer Percentage Timer is



Cramer Percentage Timer

available for seven different time ranges from 30 seconds to 60 minutes total cycle. The single pole, single throw contact is rated at 5 or 10 amperes, 115 volts. The entire timer is enclosed in a 3 1/4-inch diameter x 3 1/2-inch long dust-tight molded bakelite case for flush mounting. It can also be furnished with various types of surface mounting steel connection boxes.

## "ALL-WAY" LEVEL



The FELL Precision Level is made to show the level of all ways at once. This eliminates disturbing the first level when leveling the second. Graduations are in .0005" per foot and form squares about a circular bubble, thus giving co-ordinate readings and showing direction and amount of slope, if any.

MADE IN TWO SIZES  
5 1/2" x 12" 3 1/2" x 6"

Write for Bulletin

**W. M. B. FELL CO.**

702 SOUTH ST.

ROCKFORD, ILL.

## Cunningham Safety Sleeve Holder

A safety sleeve holder which is designed to assure clear, even impressions in marking small, round and square pieces is now being marketed by the M. E. Cunningham Co., 158 E. Carson St., Pittsburgh, Pa. The holder is said

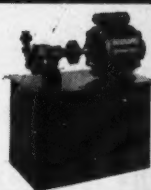
## REYNOLDS Coolant Systems for Machine Tools



No. 1-5 (Right)—Approximately 7 gal. p.m. capacity; 16" x 10" x 11" tank. 1/4 H.P. motor. For Milling and Screw Machines, lathes, etc. \$98.50 each for 110 volt, 1 phase model, and 220 volt, 3 phase model. 550 volt, 3 phase model—\$108.50.

No. 206 (Left)—Approximately 15 gal. p.m. capacity. Tank 20" x 16" x 16". 1/4 H.P. motor. For grinding machines, multiple spindle drills. \$95.00 for the 110 volt, 1 phase model, and 220 volt, 3 phase model. \$112.00 for the 550 volt, 3 phase model.

\*DEALERS WRITE FOR RESALE DISCOUNTS.



REYNOLDS MACHINERY CO., 211 EDDY ST., PROVIDENCE, R. I.

## Champion Expanding Mandrels



$\frac{1}{8}$ " to  $6\frac{1}{2}$ "  
Efficient—  
Dependable—

Write for circular

**THE WESTERN TOOL  
& MFG. CO.**  
Springfield • Ohio

## GEARS GOOD GEARS ONLY

All Kinds—Any Quantity

AT THE RIGHT PRICE

**THE CINCINNATI GEAR CO.**  
Wooster Pike Cincinnati, Ohio

**Avoid  
SPOILAGE  
of Parts!**

Faulty tapping and reaming, resulting in over-size or bell-mouthed holes, can often be corrected by merely changing to a type of tool holder that automatically compensates for spindle misalignment.

This is where the Ziegler Floating Tool Holder comes in. Try it! By eliminating scrapped parts, it pays for itself in a remarkably short time.



**W. M. ZIEGLER TOOL CO.**  
1924 12th St., Detroit, Mich.

*Ziegler*  
ROLLER  
DRIVE

WRITE FOR  
CATALOG

**FLOATING HOLDER**  
for Taps and Reamers...



**WAR VITAL**

**METAL SAWING\***

A Victor Hack Saw Blade helps you meet the urgent, stepped-up production schedule of America's Victory program. It helps you to work faster, so do cleaner cutting without fear of breakage in the frame.

The original molybdenum alloy hack saw blade, introduced by Victor under the trademarked name "Moly", is famous for fast sawing, and for licking tough jobs. It's easily identified by distinctive all-over gold metallic finish.

The Victor Unbreakable Special Flexible blade, made of a standard alloy, cuts like an all hard. Its flexibility eliminates breakage or tooth stripping in use. You'll know it by its all-over black finish and yellow lettering.

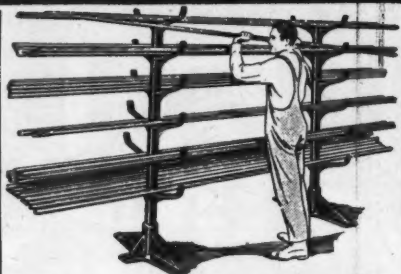
**VICTOR**  
**SAW WORKS, INC.**  
MIDDLETOWN, N. Y.



\*T.M. Reg.—Blades bearing the name "Moly" are made only by Victor Saw Works, Inc., and affiliated companies.



## SAVES TIME IN YOUR STOCK ROOM



The **BROWN SECTIONAL RACK** saves the time wasted end-hauling stock from the old-style, closed-side rack and quickens the selection of sizes by greater visibility. Built of standard metal sections: can be expanded for changes in stock or growth of business. Made in 5 styles: can't burn, depreciation practically nil.

SEND FOR BULLETIN 26-M.

**BROWN** ENGINEERING CO. 120 N. THIRD ST. READING, PA.

# Vernon

**MULTI-ANGLE  
VERTICAL  
MILLING HEAD**

Swivels horizontally and transversely ★ Reversible on overarm ★ 4 spindle speeds ★ Precision pre-loaded ball-bearings ★ Powerful 1/2 h.p. ball-bearing motor ★ Graduated dials for duplicating setups ★ Takes collets up to 1/2"

MACHINERY MANUFACTURING COMPANY  
1111 EAST 12th AVENUE, DENVER, COLORADO  
Vernon Line of HORIZONTAL MILLS, VERTICAL MILLS and JIG BOARDS, SHAPERS and GRINDERS

to be especially adaptable for marking gun barrels and small tubes and for numbering stock in warehouses or stock rooms.

The sturdy outside frame of the unit is made from alloy steel to ensure long service, and the legs of the frame are grooved for use on small rounds. The top section surrounding shank of type holder is knurled to provide positive gripping means, and a special pin, which can be easily removed for quick changing of steel type inserts, holds the type holder in place. The type holder is made of Cunningham's special "Safety" steel



Cunningham Safety Sleeve Holder

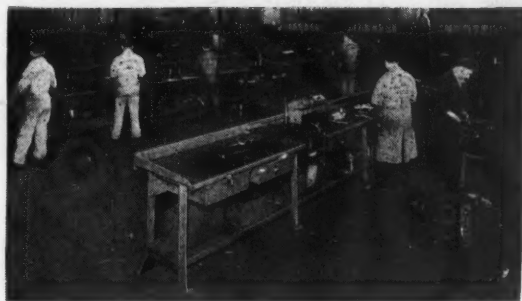
which is said to make it resistant to spalling and mushrooming, thereby providing for unusually long life.

The Cunningham Safety Sleeve Holder can be made with any size or number of characters.

## G-E Type CR7505-K108 Outdoor Photoelectric Relay

A general purpose photoelectric relay for outdoor use is announced by the Electronic Control Section of the General Electric Co., Schenectady, N. Y. Designated as the Type CR7505-K108, the relay is designed for applications requiring rapid and accurate counting, controlling, sorting, or limiting operations. Its contacts control 2 amperes at 115 volts, 25 to 60 cycles, a.c., or 0.5 ampere at 115 volts, d.c.

## WILL MORE WORK BENCHES HELP YOU? . . . IF SO, GET



# HALLOWELL

### SHOP EQUIPMENT

1367 "Hallowell" ready-made bench combinations provide a choice of the right bench for every job. Various heights, widths, lengths.

## STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 556

— BRANCHES —

BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO

For more detailed information about the "Hallowell" line get our Shop Equipment Catalog.

## You Can Drive 'Em Harder, with the RIGHT DRIVE

• Don't assume you are getting maximum production from your machine tools—new or old—if you are still using power-wasting, hazardous and shop cluttering countershaft belt drives. All over America, machine tools are turning out more work regardless of their age — taking deeper cuts at higher speeds—because they have been equipped with modern, close-connected Berkeley unit drives. By all means, *know why*. And let us also explain how the Berkeley welded steel bracket, individually engineered for each installation, makes it so easy for your own men to install a Berkeley—no extra gadgets required. These facts are vital today—ask for them by mail or wire.

## Berkeley Power Drives

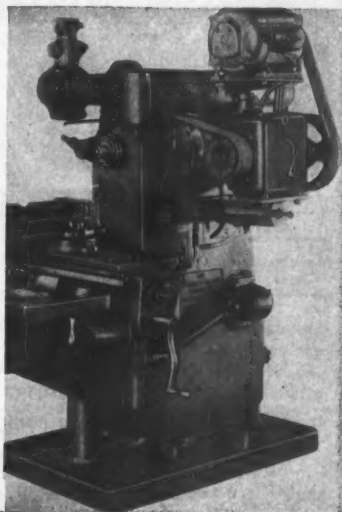
V-BELT • HELICAL GEAR • TRANSMISSION

### BERKELEY EQUIPMENT COMPANY

(Formerly located at Corry, Pa.)

New Plant and Office

1024 BAHLLIS ST., DANVILLE, ILL.



In addition to a Type GL-930 phototube, the relay contains a Type GE-117P7GT phototube. This amplifier tube is outstanding in two respects;



G-E Type CR7505-K108 Outdoor Photoelectric Relay

namely, its filament operates on full line voltage, eliminating the need for a filament transformer, and it incorporates

a diode rectifier which functions when a.c. power supply is used.

The weatherproof case of the Type CR7505-K108 relay is equipped with a sun shield and a large, directional lens system to minimize the effect of slanting sun rays. In addition, the lens system is said to increase the sensitivity of the relay.

The G-E Type CR7505-K108 Outdoor Photoelectric Relay can be mounted in any position and can be adjusted under actual operating conditions without removing the cover. The chassis can be removed easily from the case for inspection or servicing or, if desired, for mounting with other apparatus in a combination enclosure.

### "Fibre-Tex" Sweeping Compound

Known as "Fibre-Tex," a sweeping compound having an active cleaning effect upon floors to which it is consistently applied has been placed on the market by the Lacey-Webber Co., Kalamazoo, Mich. According to the manufacturer, the compound is highly oil and grease absorbent and will not burn even when the flame of a blowtorch is



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**STANDARDIZED**

**DIE SETS**

Machined Steel
Semi-Steel

Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

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1806 S. Kilbourne Ave. Chicago, Ill.

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**MILLING CUTTERS**

*for Uniform Seating of  
Whitney Woodruff-type Keys*




No need for skilled labor . . . or for filing and fitting . . . when Whitney Milling Cutters are used for seating Whitney Keys. Cutters are made in all sizes to correspond with the keys which can't roll over. Complete information in Catalog V-111. Write.

**The Whitney Chain & Mfg. Co.**  
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# IDEAL

**TIME SAVERS  
EFFORT SAVERS  
MONEY SAVERS**



**"TRIPLE BENEFITS"  
with  
"TRIPLE-DUTY"  
LIVE  
CENTERS**



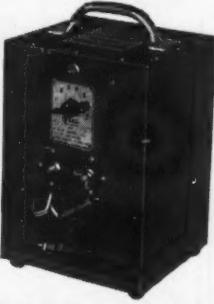
Get more work, quicker, out of machine tools. Live Center permits higher speeds, heavier loads, deeper cuts. Three easily interchangeable inserts for all kinds of centered and uncentered work. Radial load is carried on high precision ball bearing; thrust load absorbed by high precision taper roller bearing. All parts hardened and ground. Exclusive IDEAL feature.

**IDEAL**

**METAL ETCHER**

**14 Heats!**

For permanently marking tools, gages, materials, etc. With its 14 heat gradations, it quickly and easily burns identification data right into all smooth-surfaced iron, steel and their alloys, regardless of the hardness of the metal. Prevents mistakes, lessens theft and loss.



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**IDEAL Sycamore**  
• IDEAL COMMUTATOR DRESSER CO.

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Sales offices in all principal cities.



**"It's the Biggest  
Little Tool in  
the Crib"**

**Walton  
TAP EXTRACTORS  
Back Out Broken Taps**

No. 4 to 1 1/2"  
2 - 3 or 4  
FLUTE STYLE



WALTONS cut costly delays and production slowups caused by broken taps. Your tool makers and machinists should have them available in necessary sizes. Many shops say they wouldn't be without them.

Immediate Shipment on all sizes against rated orders. 48 hour Reconditioning Service for your broken and damaged tap extractors.

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**The WALTON Company**  
94 ALLYN STREET - HARTFORD, CONN.

directed squarely upon it. Grease and oil-caked dirt are said to be removed and safety stripes and other floor markings made plainer through the use of the compound.

Fibre-Tex Sweeping Compound is recommended for use in all types of industrial plants, garages, oil plants, and so on, wherever machinery is serviced or oil or grease may collect or be spilled upon floors. The compound is supplied packed in 50-lb. cartons.

### Steel Grip No. 12725 Improved Steel Reinforced Gauntlet

The illustration shows an improved type steel reinforced gauntlet—No. 12725—for heavy duty handling operations which is now being marketed by Industrial Gloves Co., Danville, Ill. Though heavily reinforced, the gauntlet is said to be unusually flexible due to the grain leather used in the manufacture. Steel ribbons diagonally placed assure maximum protection against cutting edges of material handled. The entire palm, extending up the first joint of all fingers and well around to the back of the

forefinger, is reinforced with an extra piece of leather. The thumb is patched and strapped for extra strength and



Steel Grip No. 12725 Improved Steel Reinforced Gauntlet

service. All closing seams are stitched with steel thread, thus making the

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*Permanently Accurate*  
**Torque Wrenches**



### A Complete Line

of permanently accurate measuring and gauging wrenches that are standard in leading war plants for gauging and controlling torque in production and for testing and measuring in inspection. Indestructible flat beam construction. Double scale visible from all angles. Cap.: 0 to 7200 inch lbs.

**NO**

Friction  
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Mechanisms

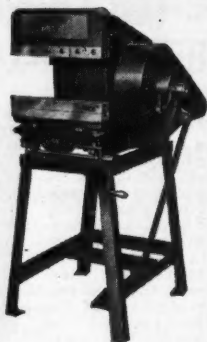
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Bulletin

PA **STURTEVANT CO.**  
ADDISON [QUALITY] ILLINOIS

### WHITNEY-JENSEN PRODUCTS 30 YEARS EXPERIENCE

### POWER PRESS BRAKE

A new machine, designed for moderate-sized work in jobbing and production shops. Stroke and adjustment 1", throat depth 6 1/4", 1 h.p. motor, 42 strokes per minute. Die bed 18" long, ram and die shoes machined for standard dies. Write for circular.



**WHITNEY METAL TOOL COMPANY**  
110 FORBES ST. • ROCKFORD, ILL.

*In War, as in Peace...*

## CERRO ALLOYS

*Save time and cut costs!*

**CERROMATRIX** (Melting Temp. 250° F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, short run forming dies and other metal-working applications.

**CERROBEND** (Melting Temp. 158° F.) Used as a filler in bending thin-walled tubing to small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

**CERROSAFE** (Melting Temp. 190° F.) Used to accurately proof-cast cavities such as molds, gun chambers, forging dies, etc., and many similar applications.

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Detroit, Mich., Castaloy Metal Sales Co.

Chicago, Ill., Sterling Products Co., Inc.

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Milwaukee, Wis., Harry C. Kettleson, Inc.

Minneapolis, Minn., Northern Machinery & Supply Co.

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Los Angeles, Calif., Castaloy Metal Sales Co.

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Copper Corporation**

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NEW YORK CITY

**NEW! SUPER-RESISTANT!**

## REPAIRS or RESURFACES

**Machine Shop Floors**



Here is a new, scientifically developed resurfacing material that will "lick the pants off of" floor disintegrators" such as acid, water, oil, grease. Where conditions are such that ordinary concrete won't stand the gaff without plenty of headaches, AWOG solves the problem to a degree never before approached. Aside from its impervious quality, AWOG sets up a smooth, case-hardened surface which is dustless and durable under the most punishing traffic conditions. Withstands grueling loads, steel wheels, hard knocks. Sanitary and easily cleaned because its close knit, non-porous surface cannot harbor germs, filth, or waste matter. AWOG is recommended for new floors; for over-lays over brick, stone, or wood; for repairing or resurfacing areas of any size indoors or out. It offers the utmost economy and trouble-free service to any machine shop or plant requiring a super floor.

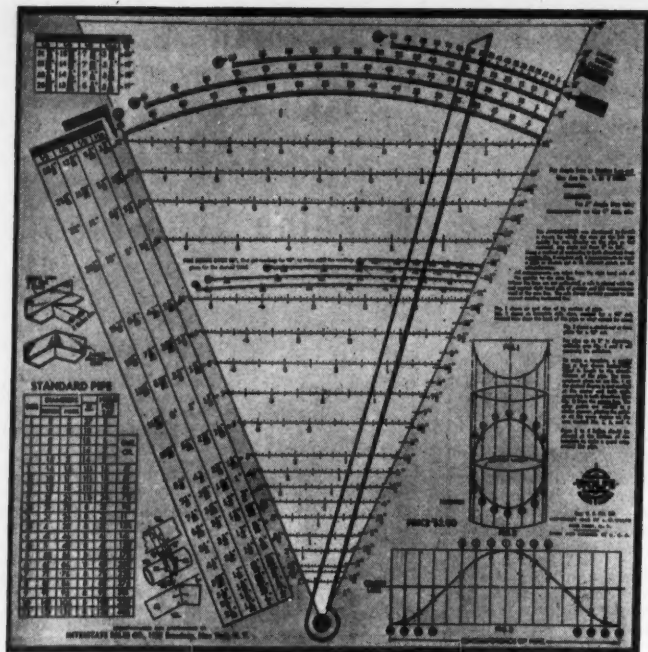


**Write for Further  
Details...  
No Obligation**

**FLEXROCK CO.**

2315 Manning Street  
Philadelphia, Pennsylvania





Wolfe Angle Meter

deg. on pipes or sheet metal which is now being offered by the Interstate Sales Co., 1123 Broadway, New York, N. Y. The device, which is designated as the Wolfe Angle Meter, is designed to give direct readings for pipes from 1 to 20 inches in diameter, however, by using the proper multiple, pipes of larger diameter can be layed out with angle bends by means of the device.

Unusually simple to use, the Wolfe Angle Meter measures  $12 \times 4\frac{1}{2}$  inches when folded, thus enabling it to be easily fitted into pocket or toolbox,

and is strongly made so as to last indefinitely. The device can be furnished flat or folded, as desired, and is available with complete operating instructions.

gauntlet practically rip-proof.

Steel Grip No. 12725 Improved Steel Reinforced Gauntlets may be obtained as pairs, all rights, all lefts, or in any combination of rights and lefts desired.

### Wolfe Angle Meter

The illustration shows a handy device for use in quickly and accurately laying out angle bends from 0 to 126

### Rose Heavy Duty All Steel Swivel Caster

The H. L. Pitcher Co., 12400 Strathmoor, Detroit, Mich., announces the Rose Heavy Duty All Steel Swivel Caster il-

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**SWISS FILES**



**5000 SHAPES and SIZES  
FOR EVERY PURPOSE**

Genuine Grobet Precision Swiss Files are world famous for utmost precision and durability since 1812. Learn more about these chrome steel files—send for Catalog KS, the most complete of its kind.

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KEEP SPOILAGE

DOWN

UP  
KEEP PRODUCTION

## Rawhide Hammers & Mallets

Replacement insert  
faces for C/R  
Hammers sold  
by leading sup-  
ply houses.

Coiled Mechanical Rawhide absorbs shock without fatiguing recoil. Delivers effective, forceful blows without crashing, battering or marring. Speeds assembly, die setting, machine adjustment, motor repair and maintenance work. Keeps production up and spoilage down.

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1281 ELSTON AVE. ★ CHICAGO, ILLINOIS.

# Grobet

## ROTARY FILES

### HAND CUT • MILLED CUT GROUND FROM THE SOLID

There is a Grobet Rotary File, Cutter, Die-sinkers' Bur in shape, size, and coarseness of cut for every type of hard or soft metal, plastic, wood, etc.

Send for Catalog KR illustrating  
the complete line in full size,  
speed charts, etc.

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421 Canal Street



New York, N. Y.

IMPORTERS OF GROBET SWISS FILES

MFGS. OF GROBET ROTARY FILES

August, 1943

MODERN MACHINE SHOP 331



Sectional View of Rose Heavy Duty All Steel Swivel Caster

illustrated herewith. The design of the unit includes a drop forged base plate with integral king pin around which is located a Timken thrust bearing. On the axle of the caster is a hardened non-turning spanner bushing and Hyatt roller wheel bearing. (Oillite or any other



**DRILL THESE HOLES**  
BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

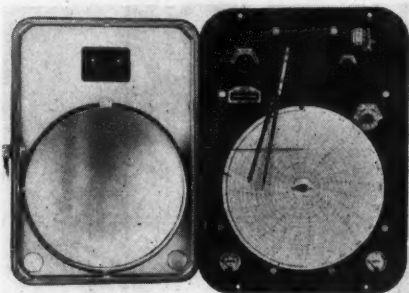
**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

special wheel bearing can also be furnished.) The caster swivels on  $\frac{3}{8}$ -inch chrome steel ball bearings which are located in a removable heat-treated steel race.

## Bristol Convertible Free-Vane Controller

An air-operated automatic control instrument for automatically controlling temperature (up to 3,600 deg. F.) flow, liquid level, pressure, draft humidity, pH value, and time program, to be known as the Bristol Convertible Free-Vane Controller, is announced by The Bristol Co., Waterbury, Connecticut.

The instrument operates on the same basic Free-Vane principle as previous



Bristol Convertible Free-Vane Controller

models offered by the company. In the convertible-type controller, however, a number of design refinements have been incorporated which simplify the instrument and make it more convenient to service. The new instrument is also designed so that the user can readily

# "OUTWEARS

the best

# Bronze Metal"

20 years ARGUTO without  
a drink—

**ARGUTO OILLESS BEARING CO.**

Wayne Junction, Philadelphia, Pa.

# ALMOND

## ★ DRILL CHUCKS



### ★ Manufacturers Since 1872

The ALMOND Three - Jaw Drill Chucks were the first to be placed on the market. They were the Pioneers in the field of Drill Chucks. Are widely used for holding drills, taps, reamers and other tools, and are always used in connection with and by being mounted upon some form of machine tool, such as drill press, lathe, or milling machine, also on portable tools, principally electric and pneumatic drills.

★ Write for bulletin giving details.

## T. R. ALMOND CO.

ASHBURNHAM, MASS., U. S. A.

## BOYAR - SCHULTZ SCREW MACHINE TOOLS

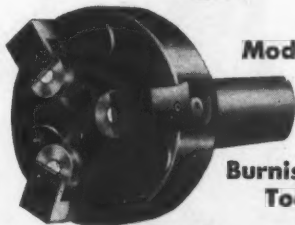
Write for  
Circulars



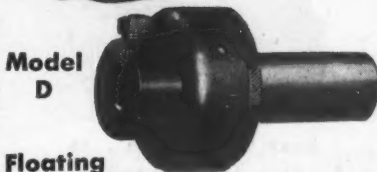
**Model A**  
for Turning



**Model B**  
for  
Turning



**Model C**  
Burnishing  
Tool



**Model D**  
Floating  
Tool Holder

**BOYAR - SCHULTZ CORP.**  
2120-J Walnut St., Chicago, Ill.

**Palmer-Shile Boom Skid for  
Lift Trucks**

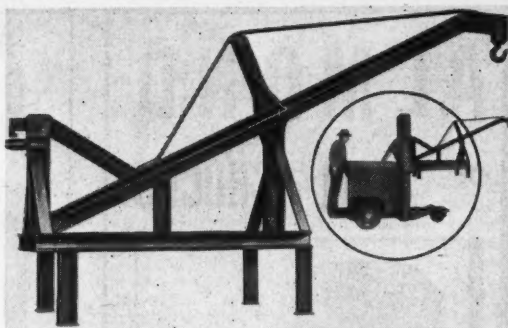
convert it from one type of control system to another.

The Bristol Convertible Free-Vane Controller is offered in the following types: Monoset (On and Off), Ampliset (Throttling), Preset, Reset, and Magniset.

**Palmer-Shile Boom Skid for  
Lift Trucks**

A boom skid which can be readily attached to either platform or fork type lift trucks, thereby enabling such trucks to pick up and move heavy objects of any weight load permitted by truck balance, is now being built by the Palmer-Shile Co., 786 S. Harrington St., Detroit, Michigan.

The boom skid is made of fabricated steel and is of all welded construction. The unit measures 114 inches long overall, the base being 54 inches long and the boom extending 60 inches beyond

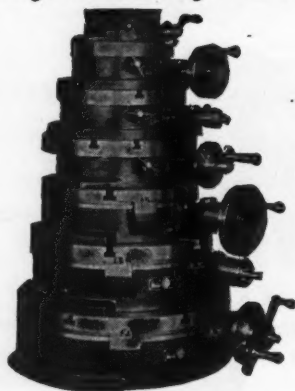


the base. Weight of the unit is approximately 350 pounds.

**Fairway Pocket-Pak**

Known as the Fairway Pocket-Pak, a nonmetallic "container" in which are packed 24 ten grain heat tablets of 70 per cent sodium chloride and 30 per cent dextrose is now being marketed by the Standard Safety Equipment Co., 232 W.

**Troyke Rotary Tables**



Sizes 9", 12", 15", 18"

Ask your dealer or write us for  
eight page catalog.

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**STEEGE MOTOR DRIVES FOR DEFENSE  
GUARANTEED FOR FIVE YEARS**

No chance of breakdown, doing a good job powering machines for defense production. No noise, floating case, results 100% power. 8 years of production proof of durability. Easily installed.

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ETC.  
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Equipped for precision  
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**Skilled  
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and Literature**

**SQUARE SURFACE PLATE & TOOL COMPANY**

221 N. MAIN ST.

ROYAL OAK, MICH.

## Robertson's ECONOMY Power Hack Saws

### FEATURES

Rugged Simplicity      Long Life  
Hairline Accuracy      High Speed  
Long Blade Life      Large Bearings

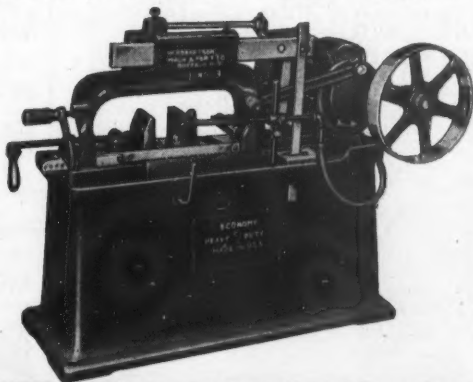
Few Adjustments

Hydraulic Lift on Back Stroke

The machine illustrated is the  
ROBERTSON ECONOMY No. 3-B.  
Capacity: 6" x 6" with 6" stroke.  
Takes 10", 12", 14" blades.

There is a ROBERTSON ECON-  
OMY for every cutting job.

Write for information  
and delivery dates.



**W. ROBERTSON  
MACHINE & FOUNDRY CO., INC.**

52 RAND ST.

BUFFALO, N. Y.

Ontario St., Chicago, Ill. When taken, these tablets are said to prevent the nausea, fatigue, cramps, and other ill effects of heat sickness.

Dust-tight and spillproof, the Fairway Pocket-Pak is designed to provide for single tablet delivery by means of one hand. The small size of the container allows for carrying in a vest pocket, thus making it particularly useful for individuals working in out-of-the-way places.

## EDUCATIONAL FILMS

### Plomb Sound Pictures on Hand Tools

A complete series of six educational sound pictures on the "Use and Care of Hand Tools," prepared under U. S. Army Ordnance supervision by the Plomb Tool Co., Los Angeles, Cal., for the instruction of students and mechanics, is now being made available to industry and vocational schools. Produced on 16mm. film, the pictures, which may be obtained as a group or singly, are said to cover practically all of the various types of hand tools in general use.

Subjects and running times of the pictures in the series are as follows: (No. 101) Wrenches (including sockets and attachments), 20 minutes; (No. 102) Pliers and Screw Drivers, 17½ minutes; (No. 103) Chisels, 12 minutes; (No. 104) Hammers, 11 minutes; (No. 105) Punches, Drifts and Bars, 14 minutes; (No. 106) Hack Saws, 18 minutes.

### Savage Gage Block Films

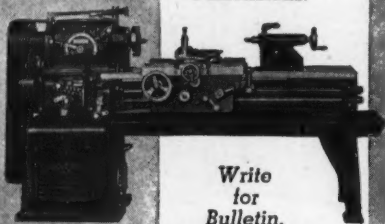
Four new 35 mm. sound slide films on gage blocks are announced by the Savage Tool Co., Dept. MM, Savage, Minn. These films, which have a showing time of more than an hour and a half, cover the following subjects: (1) Theory of Gage Blocks, (2) How Gage Blocks Are Used, (3) How Gage Blocks Are Made, and (4) The Use of Gage Instruments.

The entire history of how gage blocks came into being is graphically shown by a complete portrayal of the evolution of our modern system of measurement. The discovery of the constancy and uniformity of light waves, which finally gave man a permanent basis on which to determine the formerly arbitrary units of length, is presented in a clear and understandable manner. The film en-

### CARROLL AND JAMIESON LATHES 15" AND 16"

12 Speed Geared  
Head Motor Drive  
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Spindle.

Modern Design—  
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THE CARROLL & JAMIESON  
MACHINE TOOL CO.

DAYTON, OHIO, U.S.A.

### The BARNES Motor Driven Precision CUTTER GRINDING MACHINE

For Precision Grinding of  
Formed Milling Cutters used  
in the manufacture of rifles,  
pistols, etc.

GENERAL MACHINERY CORP.  
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Telephone Liberty 4626



### GRAY TURRET HEAD METAL CUTTER OR NIBBLER

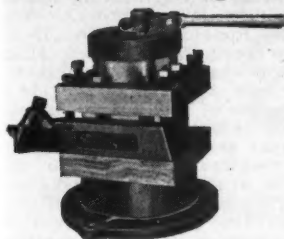


GRAY, Originator of  
First Practical Metal  
Cutter or Nibbler

Most modern Nibbler for  
Template Cutting, Tool  
Rooms, Shipbuilding, Air-  
craft Parts, Aircraft Tub-  
ing, Sheet & Plate Shops.

GRAY MACHINE CO.  
Box 596, Philadelphia, Pa.

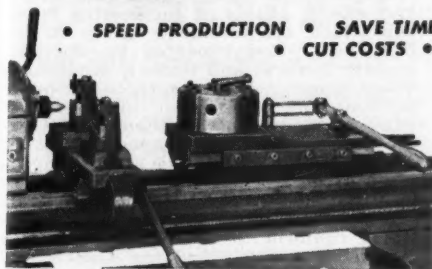
## Self-Indexing TURRET TOOL POSTS



**INCREASE OUTPUT AND PROFITS  
SAVE TIME, COST AND LABOR**

Body of square turret is constructed of solid steel. Indexes for 8 positions, 2 for each tool. Round tool post turret indexes to 6 positions.

**We have a size and style to fit  
your lathe and work requirements.**



• SPEED PRODUCTION • SAVE TIME  
• CUT COSTS •

## HEAVY DUTY Self-Indexing BED TURRETS

**HANDLE SCREW-MACHINE WORK**

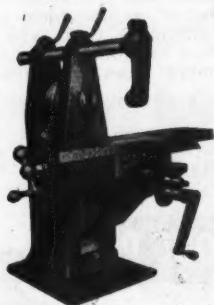
Complete unit with cutoff cross slide and tool posts designed for Logan, South Bend, Atlas and similar types of bench lathes. Has 6" head and 5½" turret travel. For lathes up to 14" swing. Bed turrets with pilot wheel for large lathes built to order. Let us know your needs.

**Write for Circular and Name of Nearest Jobber**

**LYNN MANUFACTURING CO., 219 Elroy Street, Minneapolis, Minn.**

*Lewis*

## SEMI-FINISHED CASTINGS for building Mills and Shapers!

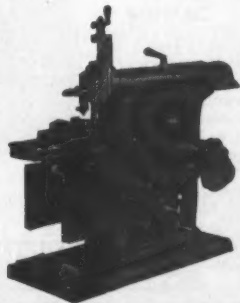


Here are two perfectly designed and shop-tested machine tools which can be quickly and economically completed in your own shop using Lewis Semi-Finished Castings, parts and construction blueprints. . . .

**Lewis Bench Mill** — requires only simple lathe, drill press and handwork to complete. Handles a full range of bench mill operations accurately and efficiently in war work, relieves larger mills for bigger work.

**Lewis 10" Shaper** — planing, milling and gear cutting are completed on this semi-finished tool . . . only simple machining is necessary. Incorporates many features found only on expensive finished units and is ideal for tool room or production line.

Prompt shipment made on priorities as low as AA-5. Send for details. Illustrated catalog mailed free on request describes 23 items. Quotations gladly furnished.



**LEWIS MACHINE TOOL CO.**

P. O. Box 116, Sta. A, Dept. T-31, Los Angeles (31), Calif.

titled "How Gage Blocks Are Used" shows the proper procedures to be followed in caring for these gages as well as the manifold uses for them in actual machining operations, inspection and checking of semi-finished and finished work.

The films are loaned free for showing before plant executives, foremen, inspectors, and trade school classes, or can be purchased at cost for permanent use. They are available through local DoAll sales offices or directly from the Savage Tool Company upon request written on company or school letterhead.

## ARTUS ARBOR SPACERS

The **COLOR** tells  
the **THICKNESS**



ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010 - .030. Speed up accurate fitting at low cost. Write for folder. Spacers, Gaskets, Shims. IMMEDIATE DELIVERY

INDUSTRIAL PRODUCTS SUPPLIERS

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New York, N. Y.

**LIKE  
MAGIC  
GROB  
OPEN END SAW**

**No Saw Welding  
Instant Internal  
Sawing**

Unsurpassed in speed, efficiency and accuracy of sawing small and medium sized dies as well as miscellaneous parts.

THE TOOLMAKER'S  
BEST FRIEND



Write or wire  
for details  
and prices



## NEW BOOKS

**Basic Problems in Engineering Drawing.** By William Wirt Turner. Published by The Ronald Press Co., 15 E. 26th St., New York, N. Y. Price, \$1.25.

This series of work sheets in engineering drawing was designed to provide a systematic course of instruction planned to accomplish definite objectives which combine a real grasp of essential fundamentals, maximum benefits to the student in the available time, and close relationship to drafting room practice. According to the publisher, these 42 work sheets cover in logical progression those basic phases of engineering drawing which are commonly given in the first year. Supplemented by the customary lectures and tests, it is felt that these sheets will prove to be adequate without the assignment of additional class problems, making them particularly suitable for the quickened tempo of many courses today. The sheets may be used with any standard textbook in engineering drawing, and in their preparation, great care has been taken to have them conform to the recommendations of the American Standards Association.

In formulating the series, the aim has been to give the student the maximum of basic work in a minimum of time and with an economy of materials consistent with adequate practice on the essential problems. This streamlining has been made possible by adherence to fundamentals, and by avoiding the inclusion of material not usable in the first course. Especially has there been careful design and refinement of each problem and of the series to eliminate that type of practice work which consumes time but is really little more than mechanical repetition.

Students successfully completing these problems should be well prepared for pursuing advanced drawing courses, for performing the duties expected of the

## TURRET TOOL POST

Hardened throughout, self-compensating for wear, precision built. For top production on small South Bend, Sheldon, Clausing, Atlas, Logan and similar bench lathes and small screw machines.



**F & M SALES COMPANY, HOLLYWOOD, CALIF.**  
MANUFACTURERS AND SELLING AGENTS

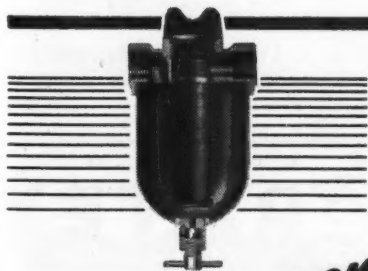
**Stop 'Em**

... with  
**NORGREN  
FILTERS!**

Stop grit, pipe scale, moisture and emulsified oil from cutting the heart out of your air tools, air cylinders and other air-actuated mechanisms.

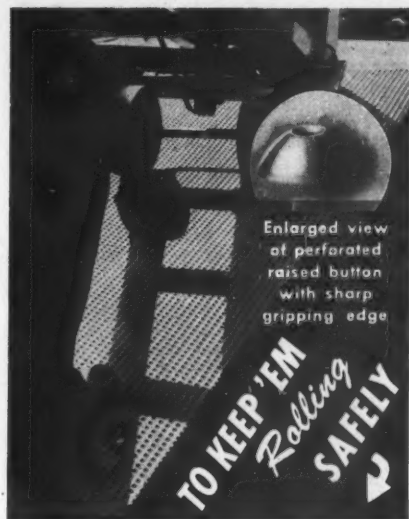
The double-thick Monel metal screen is easily removed for cleaning. Solutions and other foreign matter are deposited at bottom of filter — easily blown out simply by opening waste cock.

Sizes and types for every air line need.  
C. A. Norgren Co., 220 Santa Fe Drive  
Denver, Colo.



**Norgren**

**Get Catalog 400**



## MORTON STEEL SAFETY PLATE RAMP

Don't allow slippery ramps to endanger men, trucks or war materials. Trucks roll safer, easier and faster on loading ramps with Morton Steel Safety Tread Surfaces that "grip men's soles." Upset buttons (see detail above) die formed and *perforated*, do not wear smooth nor retain oil, water, or other liquids.

Morton Steel Safety Tread Plates can be furnished in flat sheets, or may be stiffened with turned-down edges. Ramp Plates, portable or stationary, are also used to bridge pits, holes, etc.

**HEAVY MACHINERY MANUFACTURERS:** Increase safety. Save money by using Morton Steel Safety Treads for ladders, stairs, platforms and catwalks on your equipment. *Free Sample.*

MORTON MFG. CO., 5119 W. Lake St., Chicago, Ill.

**MORTON**  
**STEEL SAFETY TREADS**

beginning draftsman in industrial drafting rooms, or for handling work where the ability to read drawings is necessary. Also, through the "Suggestions to Student," the "Instructions" for carrying out the work, and the specifications on the sheets indicating just what is to be done, they have been found to eliminate a great deal of the burden of administrative work on the instructor.

**Blueprint Reading.** Revised edition. By D. E. Hobart. Published by Harper & Brothers, 49 E. 33rd St., New York, N. Y. 130 pages. Paper cover. Price, \$1.00.

The advent of the machine age has made it desirable for a large number of persons to learn to read blueprints of machine drawings. Since machines and machine parts are necessarily represented by drawings which are produced by a method known as orthographic projection, and since the drawings are not understandable to a person untrained in their interpretation, this material has been prepared to present the fundamentals of the method of reading these drawings.

The course is the outgrowth of the author's experience in teaching the read-

ing of machine drawings at General Motors Institute, where men taking courses in machine shop practice were required to work from drawings in the machining of their practice exercises. Trial of several methods seemed to indicate that the scheme used in this text attained the desired results quickly and was just as effective as the slower method of having a student make a large number of drawings to learn the same principles.

The student, however, should not feel that the ability to give the numerical answers to the questions on the problem sheets constitutes successful blueprint reading. He should be sure in addition that he is able, after a careful scrutiny of the views, to make a mental picture of the object represented. To aid in the forming of this mental picture, the last article of the text explains a method of drawing a picture of an object from its views.

Contents of the book are as follows: Description of a Blueprint; Representation of Objects; Reading the Drawing; Kinds of Drawings; Representing an Object; Orthographic Projection; Another Way of Obtaining the Views; Hidden Lines; Reading the Drawings; Auxiliary Views; Alternative Position of the



**It's a tough worm**  
**says this bird.**

**ECLIPSE Seamless Flexible Metal Hose**  
Manufactured and Sold By



**PHILA. DIVISION** **DEPT. No. 2**  
Write for Free Bulletin No. H-201.

### New Nesting Type Tote Pans



20" long x 12" wide x 6 1/2" deep.  
16 ga., drag holes and handles both ends.

**J. L. LUCAS & SON, INC.**  
Bridgeport, Conn.

WE INVITE YOU TO TRY

**CRATEX**  
WHEELS AND POINTS

The World's Best Rubberized abrasives for  
Fine Grinding and Polishing

Attach this advertisement to your card or letterhead. We will send you a free trial sample. Or if you prefer send \$1.00 for Special 33 wheel assortment.

**CRATEX MFG. CO.** 81 Natoma Street  
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Side View; Objects Requiring More Than Three Views; The Second Auxiliary; Sectional Views; Omission of Detail Behind the Cutting Plane; Revolved Sections; Detail Sections; Offset Sections; Half Sections; Sections Through Thin Ribs; Broken-Out Sections; Quarter Sections; Partial or Broken-Out Views; Dimensioning; The Scale of Drawings; Production Operations, Their Meaning and Representation; Violations of Theory in Drawings; One View Drawings; Spur and Bevel Gears; Conventional Practice; Abbreviation; Threads; Fasteners; Assembly Drawings; Rolling Bearings; Pictorial Sketching; Shop Blueprints; Problems.

**"Slide Rule Trigonometry Simplified for Small Angles."** Especially designed for use by engineers, designers, tool-makers, inspectors, layout men, and others employing mathematics in their work, this 24-page booklet covers practical methods whereby angles or the trigonometric functions of those angles from one second to 90 degrees can be accurately calculated on the slide rule. Published by Timothy A. Schaefer, 2135 S. 78th St., West Allis, Wis., the booklet is printed in blueprint form and is

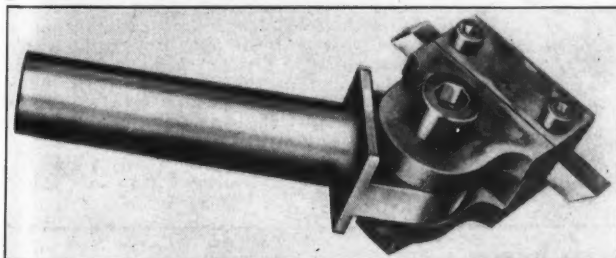
clearly and concisely written so as to enable the reader to thoroughly familiarize himself with the text within a few hours, thus providing a means for quickly and accurately solving trigonometry problems. Copy of the booklet is available at a price of \$1.00.

**A Manual of Mechanical Movements.** By Will M. Clark. Published by the Garden City Publishing Co., 14 W. 49th St., New York, N. Y. 256 pages. 589 illustrations. Cloth binding, board covers. Price, \$1.98.

This book, according to the publisher, describes the fundamentals on which all machines are built; methods of changing rotary into rectilinear motion, rectilinear into oscillating motion, slow motion into fast motion, and hundreds of other principles that go to make up modern machinery. The descriptions are clear and illustrations simple, and the whole field is so comprehensively covered that it is believed that no known mechanical principle has been omitted.

Supplementing the drawings is a series of photographs of working models that demonstrate these principles in actual motion. The models themselves, built by Mr. Clark, are on exhibition in

## ADJUSTABLE ANGLE TOOL BIT HOLDER



Made to hold standard tool bits, this adjustable angle tool bit holder allows for positioning bits at any angle.

We do not furnish tool bits. Write for bulletin featuring this tool and other items of interest to lathe users.

| Tool No. | Turret Used On | Tool Bit Size | Price   | Tool No. | Turret Used On | Tool Bit Size | Price   |
|----------|----------------|---------------|---------|----------|----------------|---------------|---------|
| 11       | 475            | $\frac{1}{4}$ | \$15.00 | 13       | 750            | $\frac{3}{8}$ | \$19.50 |
| 12       | 658            | $\frac{3}{8}$ | 19.50   | 14       | 950            | $\frac{1}{2}$ | 24.75   |

**AUTOMATIC MACHINE & TOOL COMPANY**  
AUBURNDALE • MASS.

the Museum of Science, Rockefeller Center, New York City and the Newark Museum, Newark, New Jersey.

Contents of the book are as follows: (Part One) I, Fundamentals in Mechanical Movement—Pulleys; Gears and Drives; Bearings; II, The Control of Simple Mechanical Movement—Increase and Decrease of Velocity and Force in Mechanical Movement; Change of Direction in Movement; III, Timing and Regulation of Movement; IV, Releases, Clamps, Brakes and Stops; V, Special Types of Movement—Reciprocating and Traversing Movement; Variable and Al-

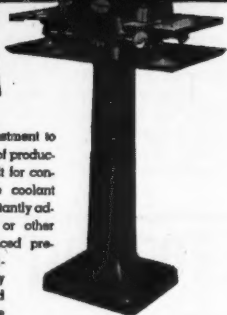
ternating Movement; Intermittent and Vibratory Movement; Parallel Movement; Oscillatory Movement; VI, Applied Mechanical Movement—Hydrostatic Devices; Engines and Valves; Gauges and Measuring Devices; Graphic Devices; Gyroscopes; (Part Two) I, Mechanical Models.

This book should be of great value to inventors, mechanics, and artisans of all types.

## The CRITERION Carbide Tool Grinder

**GREATER  
PRODUCTION  
CAPACITY**

Provides positive rapid adjustment to meet the rigid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third H.P. balanced precision bearing motor completely enclosed and radially mounted in rubber. Standard equipment: One 60 and one 100 grit 7" dia. steel backed silicon carbide wheels. Ideal for metal bonded or Resinoid bonded diamond wheels.



Order from your dealer or write direct. Request literature. No obligation.

**CRITERION**  
MACHINE WORKS  
BEVERLY HILLS, CALIFORNIA

**Essentials of Industrial Health.** By C. O. Sappington. Published by the J. B. Lippincott Co., 227 S. 6th St., Philadelphia, Pa. 626 pages. 63 illustrations. Cloth binding, board covers. Price, \$6.50.

In this book, the author has attempted to show that industrial health goes beyond the ordinary practice of curative medicine and surgery in industry, running the gamut as it does from historical foundations, centuries old in legislation and clinical development, down through the modern era of interest in economics and sociology; the development of industrial-health specialties, with particular emphasis on industrial hygiene and toxicology; the development of sanitation and health-conservation procedures; the role of illumination and ventilation, nutrition, housing, recreation, fatigue control, mental hygiene, and vital statistics; codes, regulations, and factory inspection; adaptation of the worker to the job through job analysis, aptitude and psychologic tests; consideration of the significance of industrial accidents, occupational diseases, non-occupational disability, and workmen's compensation and rehabilitation.

Industrial hygiene is highly significant because of its application of public-

**HINGES**  
VARIOUS WIDTHS  
and GAUGES



**BUTTS AND  
CONTINUOUS LENGTHS**

For  
**GUARDS  
CABINETS  
CASES  
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WRITE FOR PRICES

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4541 W. LAKE STREET

HARDWARE DIVISION

CHICAGO, ILLINOIS

health principles to industry, paralleling as it does the development of departments of public health in municipalities, states, and federal agencies, which provide health protection in many forms to the citizens of numerous communities. This book represents the application of preventive medicine and public health to industry.

Nicely illustrated, the book is divided into three parts; namely, Part I, Industrial Health Administration; Part II, Industrial Hygiene and Toxicology; and Part III, Industrial Medicine and Traumatic Surgery. Part I includes five chapters headed as follows: Origin and Later Development of Industrial Health; Occupational Morbidity and Mortality; Distribution of Industrial Health Service; Classification of Industrial Physicians; The Industrial Medical Department. In Part II are five chapters with headings: Industrial Health Exposures; The Plant Survey; Plant Sanitation and Hygiene; Personal Hygiene for Workers; Co-ordination of Industrial and Community Health Services. Part III has the following five chapter headings: The Worker and the Job; Industrial Accidents; Occupational Diseases; Non-occupational Disabilities; Workmen's Compensation and Rehabilitation.

## SHOP LITERATURE

**Norton Open Structure Grinding Wheel** is the subject of a six-page folder released by the Norton Company, Worcester, Mass. In addition to fully illustrating and describing this wheel, the folder also contains illustrations showing its use in form, surface, internal, tool and cutter grinding. Copy free.

**Light Wave Measurement.** Acme Industrial Co., 212 N. Laflin St., Chicago, Ill., has prepared a highly instructive booklet on light wave measurement. Printed in two colors and composed of 12 pages plus covers, the booklet contains various descriptive charts, illustrations, diagrams, and detailed instructions which, it is said, should go a long way toward simplifying the understanding of light wave measurement.

The booklet explains the practical everyday use of light waves in shop measurements, based on experience in the company's own shop. Any mechanic, it is claimed, can measure in millionths of an inch by following the instructions outlined in the booklet, copy of which is available free upon request.



DI-ACRO Brake forms non-stock angles, channels or "Vees." Right or left hand operation. Folding width—Brake No. 1—6". Brake No. 2—12". Brake No. 3—18".

## She's Fighting TOO!

### Making Parts Without Dies

No delay waiting for dies—parts ready quicker—deliveries speeded up—all to bring the Victory sooner! Women are rapidly taking a major place on the industrial front. DI-ACRO Precision Shears, Brakes, Benders, are ideally suited for use by women in making duplicated parts accurate to .001"—DIE-LESS DUPLICATING. Thousands of DI-ACRO Machines are now in use in War plants. Get the whole story—write for catalog—"Metal Duplicating Without Dies."



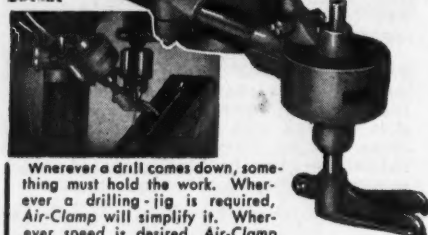
**O'NEIL-IRWIN**  **MFG. CO.**

306 8th Avenue So.,  
Minneapolis 15, Minn.

"Shaw-Box" Standard Cranes. Manning, Maxwell & Moore, Inc., Shaw-Box Standard Crane Division, Muskegon, Mich., is now issuing a 20-page catalog containing illustrations, descriptions, and outline dimensions of "Shaw-Box" standardized production built cranes, ranging from small push-type crane bridges to large capacity hand-operated cranes. The catalog also includes information on cranes with electrically operated hoists for "stand-by" service. Copy of Catalog No. 213 free upon request.

## ANNOUNCING "AIR-CLAMP"

For Greater Drill-  
Press  
Output



Wherever a drill comes down, something must hold the work. Wherever a drilling-jig is required, Air-Clamp will simplify it. Wherever speed is desired, Air-Clamp will produce it. Air-Clamp holds with relentless pressure; is undisturbed by size variations (such as in castings), it scoffs at vibration (how many drills have been broken due to faulty hold-downs), chatter, snagging. Air-Clamp holds work of any size or shape in any position, at any angle. It can pay for itself on a single fixture; it can save its cost on a few days' drill-press output. Reduces operator-fatigue. Saves hours and dollars in drafting room, jig department, tool room and production line. Air-Clamp fits any drill-press having a cylindrical column. Special fixtures for Tee-slotted tables, light milling work, etc. Hand and/or foot control. Shipped on approval to responsible concerns.

**MEAD SPECIALTIES COMPANY**

15 S. Market St. Dept. 83-AA Chicago, Ill.

## FAST

### PEERLESS Abrasive Surfacers

These machines are extremely fast for grinding and sanding flat surfaces of metal, wood, rubber, plastics, etc., and can be furnished in 9", 14" and 20" sizes.

Other types Vertical and Horizontal  
for flat or round work.

**PRODUCTION MACHINE CO.**

GREENFIELD

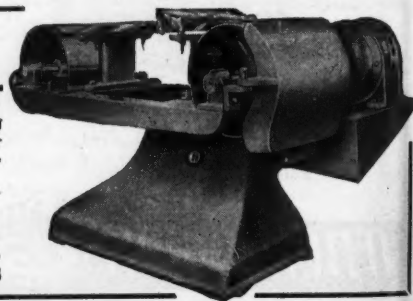
MASSACHUSETTS

Century Squirrel Cage Induction Poly-phase Motors, 1/6 to 600 h.p., are described and illustrated in a 16-page bulletin, designated as Form 344A, which is now being distributed by the Century Electric Co., 1806 Pine St., St. Louis, Mo. These motors, as the bulletin indicates, are offered in five different kinds of construction and in five different types representing different values of starting torque and starting current. The material of the bulletin is arranged in such a manner as to enable the reader to readily select the motor best suited for his particular need. Copy of Bulletin Form 344A free upon request.

"Dimensions Control — Theory and Industrial Application" is the title of a portfolio of 40 large illustrated charts on gaging for use in the classroom training of inspectors, and so on, which is now available from The Sheffield Corp., Dayton, Ohio. The charts are 27 x 32 inches in size and are bound between two heavy covers which act as a supporting easel. Included with the portfolio is a 28-page booklet outlining a talk to be given with the charts, presenting an overall picture of gaging practice in modern industry.

Covered by the charts are basic definitions, the principals of "go" and "no go" gages, wear allowance, gagemakers' tolerances, gaging policy, fixed gages, and precision measuring instruments.

This portfolio is a revised edition of a similar portfolio distributed some months ago to colleges, universities, vocational schools, and industrial training classes. Principal revision is the addition of several charts on unilateral and bilateral tolerances, gaging policy, and new precision measuring instruments. Copy of the portfolio is available at a price of \$3.50, transportation prepaid.



# Presenting REYNOLDS New POLISHING UNIT



(Illustrated here is standard Motor Driven Bench Model.)

Moderately Priced.

Showing Chuck Attachment.

Reynolds New Polishing Unit offers the following outstanding features to users—

- 1" Collet capacity with 1" hollow spindle clear through.
- Uses any standard motor (not a special built-in motor).
- Has 4-step V-Belt drive.
- Speed range
  - with 1725 RPM motor—1725-900-750-600 RPM
  - with 1200 RPM motor—1200-750-600-450 RPM
  - with 3450 RPM motor—3450-1800-1500-1200 RPM

(Note: You can purchase machine less motor and use any ½ H. P. motor available in your shop)

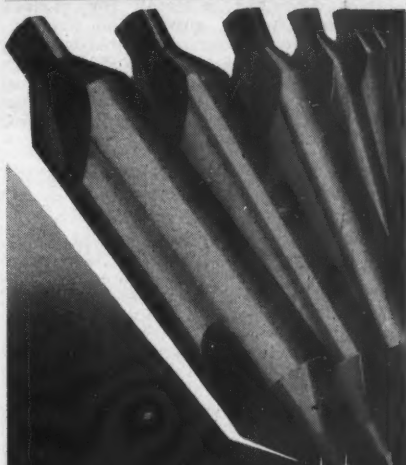
- Single lever control, starts-stops-applies brake, opens and closes collet. (Note: spindle may be stopped to inspect work without disturbing setting of piece held in collet.)
- Collets #5C Rivett: a popular size which many plants already have. This same Collet is used on South Bend 16" and 10" lathes.
- Has threaded nose spindle for use of 5" 3 jaw chuck (supplied as an extra).
- Ball bearing spindle assembly.

Write, Wire or Phone Reynolds Machinery Company, Providence, R. I., for further details.

**REYNOLDS**  
MACHINERY CO.

211 EDDY STREET PROVIDENCE, R. I.

## CENTER DRILLS



# STANDARDS FROM STOCK

**RUGGEDNESS** is characterized through the exclusive use of the "PERFEXITE" process of heat treatment.

We also manufacture

**TOOL BITS  
KEY SEAT CUTTERS  
SLITTING SAWS  
LATHE MANDRELS**

Write for New Catalog



14238 Birwood, Detroit 4, Michigan  
(Copyright '43 H.)

**"Fine Precision."** The story of fine precision work on a mass production basis is told in a booklet, "Fine Precision," prepared by the Ace Mfg. Corp., 1235 E. Erie Ave., Philadelphia, Pa. The booklet describes in detail the various precision grinding, production machining, metal stamping, and heat-treating operations as well as tool and die work performed by the company. A copy of the booklet will be sent free of charge to manufacturers requesting it on their company letterhead.

**"WSR" Method of Rating Welder Current Output.** An eight-page illustrated booklet now being distributed by the Welder Division, Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis., describes a method ("WSR") of rating welding machines whereby the exact range of usable welding current is said to be indicated. The principle of "WSR" (Welding Service Range) rating and how it differs from nominal ratings, as well as its user benefits, are explained in nontechnical language. Copy of booklet free upon request.

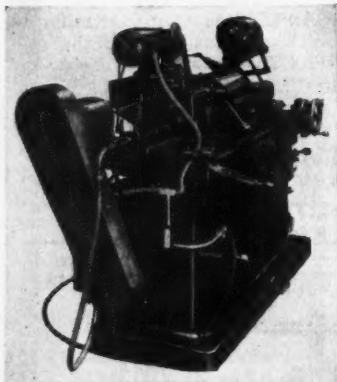
**Bristol Steel Belt Lacing.** The Bristol Co., Mill Supply Division, Waterbury, Conn., has published a four-page bulletin covering its line of steel belt lacing as to price, sizes available, features, and so on. Copy of Bulletin No. 773 free upon request.

**Wales Punching & Notching Equipment.** An eight-page illustrated bulletin describing its manufacturing and engineering facilities as well as the features, and so on, of Wales Punching and Notching Units is now being distributed by the Wales-Strippit Corp., 345 Payne Ave., North Tonawanda, N. Y. Copy free upon request.

**"Diamonds in Industry" Vol. X, No. 6.** Published by J. K. Smit & Sons, Inc., 157 Chambers St., New York, N. Y., this edition features the first installment of a series of articles on the use of diamond tools in industry. In addition to this informative and illustrated article, the booklet includes other material on diamonds, diamond tools and wheels. Copy free upon request.

# MASTERDRIVE Provides 9 to 1

## Speed Range for your Internal Grinders



Speedranger-equipped Masterdrive work-head permits selection of exact speed for desired finish. Standard precision balance motor on wheel head provided speed to suit spindle. Motorized feed drives for all types of feed. Masterdrives for your grinders are part of 750 Masterdrive specifications now available for practically any machine tool requirement. Masterdrives are a single complete unit—one responsibility.



**MASTER ELECTRIC CO.**  
INDUSTRIAL EQUIPMENT DIVISION • DAYTON, OHIO

**Cleveland No. 1½ Horizontal Production Milling Machine** is the subject of a four-page illustrated and descriptive folder released by The Sommer & Adams Co., 18511 Euclid Ave., Cleveland, Ohio. Copy free upon request.

**Universal Slotmaster.** A four-page folder released by Experimental Tool & Die Co., 12603 Greiner, Detroit, Mich., illustrates and describes the Universal Slotmaster together with setups for cutting an internal gear, chuck jaw teeth and feed cams; broaching splines; lapping deep impression dies, and so on. Copy free upon request.

**"Tooling Tips That Speed Up War Production"** is the title of a four-page folder issued by The Delta Mfg. Co., 602-E E. Vienna Ave., Milwaukee, Wis., which illustrates and describes various Delta Drill Press setups that are speeding up production in plants making projectiles, aircraft parts and engines, and so on. The folder also illustrates and describes the Delta Abrasive Finishing Machine. Copy free upon request.

**Detroit Tapping Machines.** An eight-page bulletin covering its line of high precision tapping machines has been released by the Detroit Tap & Tool Co., 8432 Butler St., Detroit, Mich. The bulletin treats in detail both light and heavy duty series machines, indicating how the number of spindles, horsepower, and so on, may be varied to suit individual conditions. Copy free upon request.

**Gear Cutting Tool Conservation Folder.** In view of the interest in the series of Michigan Tool Company advertisements featuring methods of conserving and increasing output from gear cutting tools, the contents of a number of these advertisements have been reprinted in folder form, available as Bulletin No. 531 from Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. Included are reprints headed "15 Ways to Get More Out of Shaper Cutters," "15 Ways to Get More Out of Hobs," and "Do's and Don't's in Hobbing Worm Gears." Copy of the bulletin, which is entitled "Here's How to Know How—on Gear Cutting Tool Conservation," is available free upon request.

# Super-Sterling Saws

## BROACH HACK SAW

The blade of the future . . . on the job today! The exclusive patented design of the Broach Saw puts it in a class by itself—for speed, ease of effort, clean cutting.

### "Generating" Cutting Action

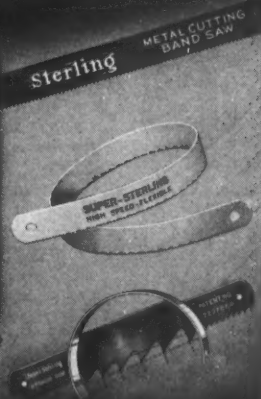
Provides a milling effect rather than a hacking cut. The Broach Saw won't stick in the cut or chatter in the frame.

Ask your Mill Supply Distributor for the Broach Saw—NOW!—Or write Dept. B.

*They don't scratch, they cut!*

DIAMOND SAW WORKS, INC.

BUFFALO, N. Y.



"Carburizing Gears in the Electric Salt Bath Furnace" is the subject of an eight-page illustrated pamphlet now being distributed by the Ajax Electric Co., Inc., Frankford Ave. at Delaware Ave., Philadelphia, Pa. Copy free upon request.

**Reading Bench Keyseater.** A broad-side illustrating and describing the Reading Bench Keyseater is now being distributed by the Reading Machine Co., Reading (Cincinnati), Ohio. Copy free upon request.



### Cut Set-Up Time

75% through use of the  
**New Advance Clamps**  
(the only T-slot clamps)

Clamp directly over work. For use on all machines with T-slots. Standard and Heavy-Duty type.

Write for circulars.

**ADVANCE MACHINE WORKS**  
3727 Weisser Park Fort Wayne, Indiana



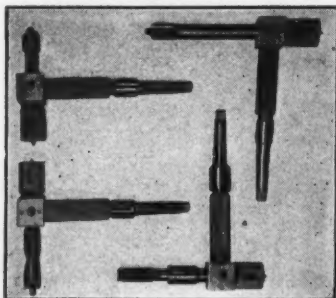
## TRICO OILERS

### KEEP UP PRODUCTION

Accurate—dependable lubrication . . . no guess-work, bearing failures, idle machines or waste when TRICO OILERS are installed.

WRITE FOR BULLETINS

**TRICO FUSE MFG. CO.**  
MILWAUKEE WISCONSIN



### INVINCIBLE Angle Tool Attachments Reach the Spot!

Drilling  
Reaming  
Tapping  
Nut Running

Counter Boring  
Spot Facing  
Counter Sinking  
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Burring  
Grinding  
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#### Vertical and Angular Milling

Send us your inquiries for Angle Tool Attachments for Tanks, Gun Mounts, Turbine Blading, Torpedoes, Ships, Gun Carriages or any problems you have at any time for tools for any operations in close corners and narrow spaces.

Write, wire, or phone ATlantic 5586-5587

**INVINCIBLE TOOL COMPANY**

611 Empire Bldg.

Pittsburgh, Pa.

"Save with Balanced Lighting" is the title of a 12-page bulletin prepared by The Fostoria Pressed Steel Corp., Fostoria, Ohio. The bulletin tells what balanced lighting is, how to achieve it, and benefits received. Several illustrations showing the application of balanced lighting are included in the bulletin, copy of which is available free upon request.

**Despatch Heavy Duty High Temperature Fans.** Bulletin No. 78 containing illustrated, descriptive, and tabular information on the line of heavy duty high temperature alloy steel fans now being marketed by the Despatch Oven Co., Minneapolis, Minn., is announced by this firm. Copy of this 12-page bulletin free upon request.

"The SC Primer of Prepared Atmospheres" is the title of a 12-page, profusely illustrated bulletin now being distributed by Surface Combustion, Toledo, Ohio, containing information concerning the different types of furnace atmospheres, their preparation, application, and relative cost. Copy of Bulletin SC-107 free upon request.

**Knu-Vise Toggle Action Clamping Tools** is the subject of an attractive catalog now being distributed by Knu-Vise, Inc., 2201 8th St., Detroit, Mich. The catalog illustrates and describes vertical handle, horizontal handle, adjustable base, and cam action toggle clamps; pliers; C-clamps; vise grips, and vises. A price list is included at the rear of the catalog. Copy of catalog free to mechanical executives.

# AGITATED COOLANTS INCREASE TOOL LIFE



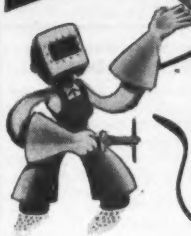
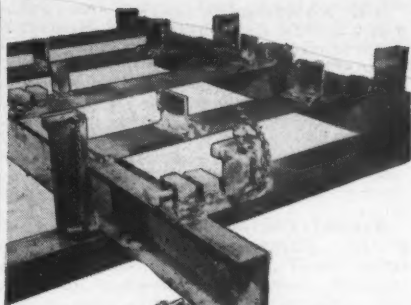
FOR over twenty years hundreds of large plants have mixed their soluble coolants and cutting compounds with "LIGHTNIN" Mixers. Their records show that it pays big dividends—saves time—vastly increases tool life—improves the finish of tooled surfaces.

You, too, can enjoy each of these advantages. "LIGHTNIN" Mixers come in various sizes and capacities. Whether you "make up" for individual machines or have a central circulating or cooling system, there's a "LIGHTNIN" that will mix your cutting oils and save you money. And there are no installation costs. A "LIGHTNIN" can be readily clamped onto your present tank or vessel regardless of its size or shape.

Write today for the "LIGHTNIN" Mixer catalog. Tell us the size of your tank or tanks and the current available. We'll give you complete details.



**MIXING EQUIPMENT CO., INC.**  
1048 Garson Ave. Rochester 9, N. Y.



*There it is  
**TAKE IT AWAY!***

...that's the shout of tool and die men in progressive shops where they use A.C. welding for the fast, low cost fabrication of all sorts of tools, dies, jigs and fixtures.

Electric welding short cuts costly and time consuming drilling, tapping, machining and dowelling and saves critical tool steel.

Send for free,  
24 page,  
illustrated  
booklet.

**MARQUETTE  
MANUFACTURING  
CO., INC.**  
Minneapolis,  
Minnesota



**MARQUETTE**

**A.C. ARC WELDERS**

**G-E Photoelectric Relay** for automatic control are covered as to features, application, maintenance, types available, and so on, in a four-page illustrated bulletin issued by the General Electric Co., Schenectady, N. Y. Copy of Bulletin GEA-11755E free upon request.

**Ramsey Chains, Sprockets, and Couplings.** Ramsey Chain Co., Inc., Albany, N. Y., now has available a 64-

**Accurate Hole Transfer Made Easy With  
NIELSEN TRANSFER SCREWS**



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular.

**NIELSEN TOOL &  
DIE COMPANY**

1960 W. Eleven Mile Rd.  
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page catalog containing list prices and engineering information on the design and application of Ramsey Silent Chain Drives and Flexible Couplings. Copy of this leatherette-covered, plastic-bound catalog can be obtained by mechanical executives requesting Catalog 642 on their company letterhead.

**Bliss High-Production Presses.** A 24-page catalog regarding Bliss High-Production Presses has been published by the E. W. Bliss Co., 53rd St. and 2nd Ave., Brooklyn, N. Y. The catalog contains full-page illustrations of the various model presses in the line, also complete tables of press dimensions. Specimens of stampings produced on Bliss High-Production Presses are also shown. Copy of Catalog No. 27 free upon request.

**Airco Oxyacetylene Flame Adjustment Color Chart.** Prepared particularly for the guidance of new welders, this chart contains natural color photographs of five fundamental flame adjustments: (1) acetylene burning in air; (2) a strongly carburizing flame; (3) slight excess of acetylene flame; (4) neutral flame; (5) an oxidizing flame. Copies of the chart can be obtained by writing to the Air Reduction Co., 60 E. 42nd St., New York, New York.

"The Welding of Piping" is the title of a 16-page illustrated booklet now being issued by Air Reduction Co., 60 E. 42nd St., New York, N. Y. The booklet consists of a series of articles prepared by Air Reduction's Applied Engineering Department, covering various types of ferrous and nonferrous piping, their dimensions and fabrication, and estimates of welding and labor costs. Copy free.



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**"Hard-Facing with Coast Metals"** is the title of a 12-page booklet released by Coast Metals, Inc., 1232 Camden Ave., S. W., Canton, Ohio, covering the properties of Coast Metals Hard-Facing Weld Rods, their application and use in the restoration of worn parts to original dimensions. Copy free upon request.

**Ohio Motors.** Designated as the No. 210, a 12-page bulletin describing and illustrating split-phase, direct-current, capacitor, polyphase, shell-type, aircraft, shaded pole, synchronous, and torque motors and dynamotors is now being distributed by The Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland, Ohio. Copy free upon request.

**Dayton Rogers Pneumatic Die Cushions.** An eight-page bulletin containing illustrated and descriptive information regarding the application of Dayton Rogers Pneumatic Die Cushions to various types of dies for blanking, drawing, forming, piercing, and trimming workpieces is now available from the Dayton Rogers Mfg. Co., 2835 S. 12th Ave., Minneapolis, Minn., free upon request.

**Ro-Flo Compressors and Vacuum Pumps** of the sliding vane type are featured in a 20-page bulletin announced by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Designated as the B-6211, the bulletin presents complete engineering data on these units, including installation diagrams, curves showing the relationship between pressure, temperature, and volume, photographs, and sectional views. Copy free to users of compressors or vacuum pumps.

**"Magna-Sine" Magnetic Sine Table and Non-Magnetic Sine Plate.** Robbins Engineering Co., 318 Midland Ave., Detroit, Mich., now has available a four-page folder illustrating and describing the features, application, and so on, of the Magna-Sine, a magnetic sine table designed to hold a magnetic material at any required angle, either single or compound, for purposes of grinding, honing, lapping, machining, inspecting or checking flat surfaces, radial holes, bevels, chamfers, and so on, which are at an angle in relation to the base surface. The folder also describes and illustrates a non-magnetic sine plate for use in the accurate checking of angular machining work. Copy free upon request.

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**Bristol's Steel Belt Lacing** is the subject of Bulletin 728A announced by The Bristol Co., Mill Supply Division, Waterbury, Conn. Copy free upon request.

**Berkeley Power Drive Folder.** The Berkeley Equipment Co., 1024 Bahls St., Danville, Ill., is now issuing a colorful folder on the subject of power drives. Principal types of drives are illustrated together with a variety of interesting installations. Copy of folder free upon request.

## DIX PRECISION MADE AND AVIATION TYPE UNIVERSAL JOINTS

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### "Metal Stamping in Small Lots."

Written by Dayton A. Rogers, this 20-page booklet illustrates and describes the facilities of the Dayton Rogers Manufacturing Company for making special dies for producing metal stampings in small lots according to any desired specifications. Copies of the booklet can be obtained by writing to the Dayton Rogers Mfg. Co., 2835 S. 12th Ave., Minneapolis, Minnesota.

**American Gages and Tools.** A four-page bulletin illustrating and describing the American Thread Checker, Amplifying Gage, Hole Checker, Bench Center, Universal Radius Dresser, and Diamond Pattern Lapping Plate is now being issued by The American Gauge Co., 125 Bayard St., Dayton, Ohio. Copy of Bulletin No. 43 free upon request.

### South Bend Turret Lathe Bulletin 1002.

A four-page bulletin illustrating and describing South Bend Nos. 1001-Z and 1002-Z Turret Lathes for small chucking and bar work is now being issued by the South Bend Lathe Works, South Bend, Ind. Conveniently tabulated specifications include all necessary information concerning capacities, feeds, speeds, and dimension. Copy of Bulletin 1002 free upon request.

"Stanley Tools for Victory" is the title of a 56-page catalog designated as the No. 50 which is now being offered by Stanley Tools, Division of The Stanley Works, 137 Elm St., New Britain, Conn. The catalog includes illustrated, descriptive, and tabular information on anvil tools, awls, boring tools, drills, chisels, file holders, hammers, knives, levels, miter boxes, punches, rules, saw sets, screw drivers, sledges, soldering irons, squares, vises, and so on. Copy of Catalog No. 50 free upon request.



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AUTOMATIC  
EQUIPMENT

**THE V & O Press Co., INC.**  
HUDSON, N. Y.

**Reeves Variable Speed Transmission with Built-In Reducer** is the subject of a 16-page illustrated catalog, designated as the TR-432, now available free of charge from the Reeves Pulley Co., Columbus, Indiana.

"... **For Resistance Welding by Frostrode**" is the title of a six-page illustrated folder published by Frostrode Products, 19003 John R St., Detroit, Mich., describing the design, construction, and operation of "Frostpoint" permanent electrodes with replaceable finned "Frostcaps," also "Frostpoint" adapter holders for converting any spot welder to the refrigerated welding process. Copy free upon request.

**Cleereman Drilling Machines** for use in performing high speed drilling, boring, and tapping operations are covered as to construction, operation, design features, applications, specifications, and so on, in a 20-page illustrated catalog now being distributed by the Bryant Machinery & Engineering Co., 400 W.

Madison St., Chicago, Ill. Copy of Catalog No. 400 free upon request.

**Clark Hardness Tester.** A 20-page reference manual on the history, theory, and practice of and equipment for modern, scientific hardness testing has been prepared by Clark Instrument Inc. Printed in two colors, a copy of this 8 1/2 x 11-inch manual is available without charge to manufacturing executives addressing a request on their company letterhead to Department MS, Clark Instrument Inc., 10200 Ford Rd., Dearborn, Michigan.

"**Zinc in War.**" A new folder in the series "Zinc in War" is announced by The New Jersey Zinc Co., 160 Front St., New York, N. Y. This four-page folder tells the story of the men and equipment behind the war-time production of zinc, illustrating and describing mining, manufacturing, and testing operations. The fourth page of the folder contains several illustrations showing war uses for zinc. Copy of "Zinc in War" free upon request.



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**"Selecting the Right Steel for Plastic Molding"** is the title of an eight-page illustrated booklet prepared by the Crucible Steel Company of America, 405 Lexington Ave., New York, N. Y. Copy free upon request.

**Sil-Fos and Easy-Flo Brazing Alloys.** Designated as the No. 12-A, a 20-page bulletin now being distributed by Handy & Harman, 82 Fulton St., New York, N. Y., contains complete information on Sil-Fos and Easy-Flo low-temperature brazing alloys, including illustrations and descriptions of their application to various metal parts and products. Copy free upon request.

**Detroit Stock Record Sheets.** Since the tremendous demands for thread, plug, and ring gages prevent the carrying of a complete stock at all times, the Detroit Tap & Tool Co., 8432 Butler St., Detroit, Mich., is now issuing approximately every 15 days stock record sheets indicating the sizes and types of gages currently available. Copies of these sheets can be obtained free upon request.

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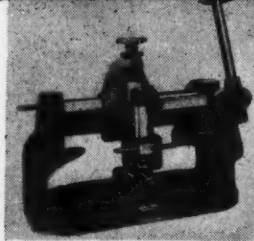
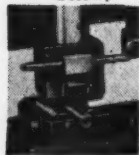
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**Walton Tap Extractors** is the subject of an eight-page folder published by The Walton Co., 98 Allyn St., Hartford, Conn. In addition to illustrating and describing these tools and their use, the folder also contains price tables and table for use in selecting the various sizes and types of tap extractors. Copy free upon request.

**"The Motch & Merryweather Triple-Chip Method"** is the title of an eight-page bulletin now being issued by The Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland, Ohio, illustrating and describing the M. & M. Segmental Saw Blade and its application in the cutting of metals by the cold sawing method. Copy free upon request.

**Bristol Convertible Air-Operated Controllers.** Designated as the No. A112, an eight-page bulletin covering a line of convertible free-vane air-operated controllers has been published by the Bristol Company, Waterbury, Conn. Data is presented on the five types of controllers available together with information for converting controllers from one type to another. Copy of Bulletin No. A112 free upon request.

**Reco Motor-Driven Controls.** A four-page bulletin now being distributed by the Reynolds Electric Co., 2650 W. Congress St., Chicago, Ill., illustrates and describes a line of motor-driven controls for predetermined timing, time delay, synchronizing, automatic starting and stopping, reversing actions, sequence operations, automatic and repeat cycles, signaling and keying, and so on. Copy of Bulletin No. 71 free upon request.

**"Servicing Respirators, Goggles, Face and Eye Shields, Helmets, Etc."** is the subject of a five-page Special Service Report issued by Oakite Products, Inc., 57 Thames St., New York, N. Y. After pointing out the necessity for providing adequate facilities for maintaining personal safety equipment, the report discusses the equipment and materials required for effectively carrying out such a program. The four essential steps in handling maintenance of respiratory and other equipment are described, together with recommendations and detailed instructions.

Since there is considerable variance in the design and construction of respirators and goggles, special care must be taken when cleaning sensitive metal and rubber parts. It is pointed out, for example, that strong alkalis should be avoided for cleaning aluminum and aluminum alloy parts of safety equipment. Rubber parts, because of their particular sensitivity to strong solvents, grease, oil, and so on, should be cleaned with mild detergents.

Methods for care and maintenance of goggles, helmets, and shields of both plastic and metallic construction, hose masks, and rubber gloves are also discussed. The report cautions against the use of strong alkalis or solvents when cleaning fiber helmets with special varnish or lacquer finishes for the reason that such materials may remove these protective coatings.

Before chemical treatment is applied to the glass shields in welding hoods to lessen breakage and prevent slag adher-

ence, glass surfaces should be free of oil, grease, paint, and so on. A fast, effective method is outlined for putting glass in this condition.

The subject of germicidal treatment of respirators, goggles, and so on, by several different methods is also discussed. In addition, many hints and suggestions for handling the maintenance of safety devices in a fast, orderly manner are included in the report. Copy free.

**South Bend 9-Inch Lathe Catalog. A**  
12-page catalog devoted to South Bend



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for  
the Big  
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**9-Inch Lathes Models A, B, and C** has been published by the manufacturer—South Bend Lathe Works, South Bend, Ind. The catalog illustrates and describes both the bench and metal column base types in which the three models are available. Tabulated specifications give complete information on capacities, feeds, speeds, and dimensions. Copy of Catalog No. 9C free upon request.

**Lyon Welding Positioner.** A four-page bulletin illustrating and describing Lyon Hydraulically Operated Welding Positioners and Hydraulic Elevating Welding Tables is now being offered by the Lyon-Raymond Corp., 216 Madison St., Greene, N. Y. Copy of Bulletin No. 131 free upon request.

**Sav-Way Multi-Purpose Internal Grinders.** A four-page folder illustrating and describing the Sav-Way MI Series Hand Feed Multi-Purpose Internal Grinder is now being distributed by Sav-Way Industries, Machine Tool Division, 4869 E. 8 Mile Rd., Detroit, Mich. Copy free upon request.

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**"Pipe Templates for Welded Fittings,"** a 12-page illustrated booklet published by Air Reduction Company, tells how to fabricate fittings for welded piping installations by means of flame cutting and welding. Illustrations show how to draw up and use paper templates for flame cutting pipe to assure accurate, close-fitting connections.

The templates and procedures described in this booklet are intended primarily for use where special fittings are required or where stock welding fittings may not be available when needed. Copy may be obtained by writing to Mr. G. Van Alstyne, Air Reduction, 60 E. 42nd St., New York, New York.

**"Aiding War Production with Clean, Dry Air"** is the title of an eight-page bulletin released by the Logan Engineering Co., 4900 Lawrence Ave., Chicago, Ill. The bulletin points out the unnecessarily high maintenance and replacement costs and loss in man-hours resulting from moisture and dirt in compressed air lines, and graphically shows how the Aridifier produced by Logan cleans and dries compressed air by centrifugal force. The manner in which this compact, cast unit is placed in an air line is shown and complete specifications for sizes from  $\frac{3}{4}$  to 10 inches are given. In addition, a number of representative installations are pictured and the contaminated air problem that was solved in each is detailed. Copy of Bulletin No. 543 free upon request.

**"Hy-Mac" Equipment Catalogs.** Two four-page catalogs, one illustrating and describing "Hy-Mac" Hydraulic Power Units and the other "Hy-Mac" Hydraulic Test Units, have been released by Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich. The power unit catalog treats 10 different models that are typical of units which can be used in conjunction with new machines or for change-over to hydraulics. These units may be adapted to any motion desired—feeding and traversing of multiple or single tools, indexing, and locating—as applied to grinding, milling, boring, drilling, riveting, piercing, pressing, and other operations.

The test unit catalog covers a few of the models that have been recently built for checking hydraulics before and after assembly, including a portable unit that may also be equipped with a gasoline-engine-driven pump for field testing. Copies of both catalogs free.

"Studies in Arc Welding." Complete information on arc welding of great value in war production and with many extremely important peacetime applications is soon to be made available by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, in the form of a 1,200-page book containing 98 of the outstanding award studies submitted in the Foundation's 1940-1942 Industrial Progress Award Program. This timely volume, entitled "Studies in Arc Welding," will make available the accumulated knowledge and experience of more than 100 engineers, designers, and others applying themselves individually to a specific design study involving arc welded construction. While the vast majority of the studies to be published involve products of plants engaged in war production, the principles and practices reported in the individual papers should be of inestimable value in postwar uses of the arc welding process.

In selecting the papers for inclusion in the book, the editors carefully considered the subject matter of all of the 408 papers for which the authors received awards.

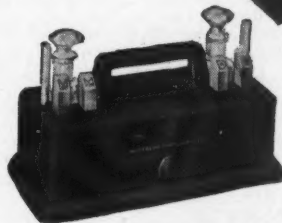
The contents of the book are to be arranged in nine sections. The sections and number of chapters in each section will be as follows: Section I, Automotive, 11 chapters; Section II, Aircraft, 7 chapters; Section III, Railroad, 9 chapters; Section IV, Watercraft, 4 chapters; Section V, Structural, 11 chapters; Section

VI, Furniture and Fixtures, 6 chapters; Section VII, Commercial Welding, 4 chapters; Section VIII, Containers, 6 chapters; Section IX, Machinery, 40 chapters.

"Grid" Cast Iron Unit Heaters, product of the D. J. Murray Mfg. Co., Wausau, Wis., are described in a catalog sheet now available from this firm free upon request.

## Amazing S-22 Synthetic ETCHING STAMPS

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# FOR YOUR CATALOG LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

## 1. Gears and Gear Units

Farrel-Sykes gears and gear units for all purposes are detailed in Bulletin 438. Farrel-Birmingham Co., Inc., Ansonia, Connecticut.

## 2. Air Gun

Illustrations and details featuring the Air-O-Chek air gun are presented in catalog available from Air-Way Pump & Equipment Co., 403 S. Jefferson St., Chicago, Illinois.

## 3. Band Saw Guides

Literature describing Paddock Ball Bearing Band Saw Guides may be obtained from Paddock Tool Co., 1418 Walnut St., Kansas City, Missouri.

## 4. Multiple-Diamond Tools

Facts about Tru-Line multiple-diamond Tools for straight, profile and step dressing operations are available in new book published by Wheel Trueing Tool Co., Inc., 3200 W. Davison Ave., Detroit, Michigan.

## 5. Lathe Turrets

Details on 5-station Lathe Turrets as well as other helpful information for all lathe users may be obtained from Automatic Machine & Tool Co., 132 Charles St., Auburndale, Mass.

## 6. Welding Positioners

Bulletin WP 22 presents details on C-F Welding Positioners. Cullen-Friedstedt Co., 1311 S. Kilbourn Ave., Chicago, Illinois.

## 7. Carbide Tool Grinder

New Catalog giving full details on the Delta Carbide Tool Grinder may be obtained from The Delta Manufacturing Co., 602H E. Vienna Ave., Milwaukee 1, Wisconsin.

## 8. Dial Indicators

Catalog No. 52 outlines facts on the Ames Hundred Series Dial Indicators. B. C. Ames Co., Waltham, Mass.

## 9. Chucks

Catalog No. 550 presents details on Westcott Chucks. Westcott Chuck Co., 702 E. Walnut St., Oneida, N. Y.

## 10. Die Sets

Facts on Producto Die Sets are detailed in 100-page catalog available from The Producto Machine Co., 990 Housatonic Ave., Bridgeport, Conn.

## 11. Carbide Tools

Carbide Tool folder and wall chart presenting helpful data on New England Standard Carbide Tools are available from New England Carbide Tool Co., 60 Brookline St., Cambridge, Massachusetts.

## 12. Shapers

Catalog S-3 presents details on the complete line of Cincinnati Shapers. The Cincinnati Shaper Co., Cincinnati, Ohio.

## 13. Expanding Mandrels

K. O. Lee Co., Aberdeen, South Dakota, has issued Bulletin No. M-42-M outlining details on K-O Expanding Mandrels.

## 14. Oil Groovers

Catalog featuring Fischer Oil Groovers is available from Fischer Machine Co., 310 N. Eleventh St., Philadelphia, Pennsylvania.

**A SP Universal Check Valve** for aircraft hydraulics is the subject of a four-page colorful folder now being offered by American Screw Products, 7000 Avalon Blvd., Los Angeles, Cal. Copy free upon request.

**"No-Wear Metal."** A four-page bulletin descriptive of "No-Wear Metal"—a for hard facing—has the Callite Tungsten Corp., Union City, N. J. The bulletin discusses the advantages and physical characteristics of No-Wear Metal for hard facing. Methods of application and typical uses for this material are also treated. Copy of Bulletin No. 153 free upon request.

**Carbology Die Manual.** A 32-page manual covering standard and special cemented carbide dies for drawing wire, bar, tubing, and sheet metal has been made available by the Carbology Co., Inc., 11143 E. 8 Mile Ave., Detroit, Mich. Revealed in the manual is the fact that the Carbology line of dies has been considerably expanded.

Presented are detailed recommendations on die shapes for drawing round wire, bar and tubing, together with complete illustrations and listings of suggested die room accessories, supplies, and equipment. In addition, a number of parts having complicated shapes

which have been produced with Carbology carbide dies are illustrated in the manual, copy of which is free.

**Bakewell No. 0 Precision Tapping Machine.** A four-page bulletin containing illustrations, descriptions, and specifications regarding the Bakewell No. 0 Bench Model Tapping Machine is now being distributed by the Bakewell Mfg. Co., 2023 Santa Fe Ave., Los Angeles, Cal. Copy free upon request.

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**15. Collapsible Machine Tap**

Improved Murchey Collapsible Machine Tap Type "BM" is illustrated and described in new Type "BM" Catalog issued by Murchey Machine & Tool Co., Dept. M-3, Detroit 26, Mich.

**16. Hardness Tester**

Details on Clark Hardness Testers as well as references on the history, theory, and practice on hardness testing are presented in new 20-page reference manual issued by Clark Instrument Inc., Dept. MS, 10200 Ford Rd., Dearborn, Michigan.

**17. Gages, Jigs, Dies**

A new illustrated catalog featuring Precision Gages, Jigs, Fixtures and dies is available from Quality Tool & Die Co., Vermont and Noble Streets, Indianapolis, Indiana.

**18. Height Gauge**

Folder illustrating the range of jobs handled with the Dickerman Height Gauge is available from H. E. Dickerman Mfg. Co., 321 Albany St., Springfield, Massachusetts.

**19. Transfer Screws**

New circular detailing Heimann Transfer Screws for setting dies has

been issued by Heimann Mfg. Co., Urbana, Ohio.

**20. Collet Chucks**

Bulletin "D" features Erickson Collet Chucks. Erickson Steel Co., 2309 Hamilton Ave., Cleveland, Ohio.

**21. Short Run Piercing**

Details on Short Run Piercing operations are outlined in New Wiedemann Bulletin 92, Wiedemann Machine Co., 1821 Sedgley Ave., Philadelphia, Pa.

**22. Hints on Grinding**

"Better Grinding" is the title of helpful book illustrating and describing basic principles of precision grinding. Available from Landis Tool Co., Waynesboro, Pennsylvania.

**23. Quick-Change Chuck Manual**

New McCrosky Quick-Change Chuck Manual may be obtained from McCrosky Tool Corporation, Meadville, Pennsylvania.

**24. Automatic Saw Sharpener**

Folder 57T presents facts on Wardwell Automatic Saw Sharpening Equipment. The Wardwell Mfg. Co., 3166 Fulton Rd., Cleveland, Ohio.

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**August**

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SPECIALIZING IN HIGH SPEED CUTTING TOOLS TO YOUR PRINTS

# In the tight spots it's a STAR

ELECTRO LIFT'S Type B Monorail Hoist is designed to operate with extremely limited headroom. At the same time, it must provide powerful lifting capacity at high speed. A "tight spot" for the motor? No doubt about it. But Star, through its unique welding construction, solves the problem completely without special molds or castings. Result: "Tailored" 4 HP. motors complete with magnetic brake supplied as easily as any standard model. (The trolley motor is a STAR too—1 HP in standard design.) Just another example of Star performance which combines the flexibility of specialized application and specialized engineering with the obvious advantage of standardized design.

Star Electric Motor Company  
Bloomfield, New Jersey



For 33 years Star Motors have provided a complete line of standard as well as specialized motors—in sizes from 1/2 to 200 HP. Today they are providing dependable power for hoisting and many other applications. Write us about your requirements.



POWER PACKAGED AS YOU NEED IT

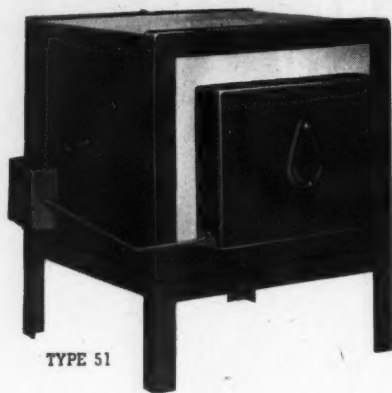
# STAR MOTORS

August, 1943

MODERN MACHINE SHOP 365

# MUFFLE FURNACES

**[ MULTIPLE  
REPLACEABLE  
UNITS ]**



TYPE 51

**CONSTRUCTION** — All materials used are of the highest commercial grades and are the same as incorporated in larger and more expensive furnaces. Due to the small size, however, and to the low cost, it is not as efficient at the higher temperatures as those furnaces listed in Bulletin HD-535.

**USES**—Type 51 Muffle Furnace has been designed primarily for general laboratory requirements where the service will be light or intermittent. It may be used at temperatures up to 1750° F. (955° C.) without noticeable shortening of element life, and may occasionally be used up to a maximum temperature of 1850° F. (1010° C.) for short periods of time.

**VOLTAGE**—This furnace is standard for use on 115 volt A. C. or D. C. but can be supplied for use on 230 volts A. C. or D. C. at no added cost. For use on other voltages, there is a small additional charge.

**WATTAGE**—The furnace input is 1150 watts maximum and is low enough to permit connecting to the usual electrical appliance outlet.

**CONTROL**—Rheostats can be supplied for temperature regulation which will permit gradual control down to a minimum temperature of approximately 900° F. (482° C.).

## SPECIFICATIONS

| SIZES |        |       |        |         |       |         |        | APPROX. NET WEIGHT |          | APPROX. BOXED WEIGHT |               |
|-------|--------|-------|--------|---------|-------|---------|--------|--------------------|----------|----------------------|---------------|
| Type  | Inside |       |        | Overall |       |         |        | Furnace Only       | Rheostat | Furnace Only         | With Rheostat |
|       | Width  | Depth | Height | Width   | Depth | Height  | Height |                    |          |                      |               |
| 51    | 5 1/4" | 8"    | 3 3/4" | 13 3/4" | 14"   | 13 3/4" |        | 60                 | 5        | 85                   | 95            |

See Your Laboratory Supply Dealer

## HEVI DUTY ELECTRIC COMPANY

LABORATORY FURNACES

**MULTIPLE UNIT**

ELECTRIC EXCLUSIVELY

TRADE MARK  
U.S. PAT. OFF.

**MILWAUKEE, WISCONSIN**

You get accurate, dependable results and

# SAVE A LOT OF MONEY

—with the Delta Carbide Tool Grinder



**This low-cost grinder runs absolutely true, free from vibration, for fine grinding of carbide tipped tools**

Manufactured by modern precision methods in a modern plant, this sturdy, vibrationless Delta Carbide Tool Grinder is so well-built, so accurately machined that you can depend on especially fine results.


It is so low in cost that it can be used profitably in *any* shop — large or small. Combined with the Delta standard tool grinder for hogging down the shank steel, it gives you a perfect working combination for sharpening tungsten carbide tools, with a remarkably small initial investment. Many outstanding features to assure accuracy and long life.

Widely used in war plants, this good-looking, modern machine has made a record for itself wherever it has been installed. Get credit for discovering the low-cost Delta way in *your* plant. Investigate! Send for the new Delta catalog giving full details.

M-2C

TEAR OUT AND MAIL THIS COUPON TODAY

**DELTA**  
**MILWAUKEE**  
**Machine Tools**

  
**THE ARMY-NAVY "E"** —  
awarded for excellence in the  
production of machine tools  
vital to the war effort.

THE DELTA MANUFACTURING CO.  
602H E. Vienna Ave., Milwaukee 1, Wis.

Please send me your new catalog giving full details on the Delta Carbide Tool Grinder and your full line of low-cost machine tools.

Name.....Position.....

Company.....

Address.....

City.....(.....) State.....  
Zone

# Exclusive Concentration

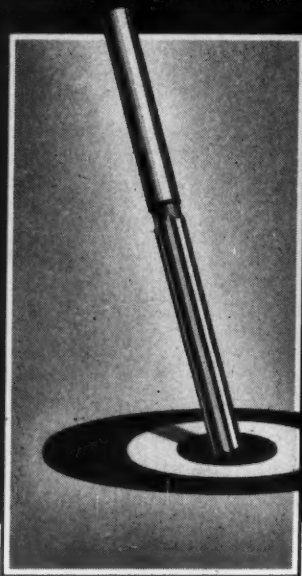
on the

## Production

of

# SMALL REAMERS

Sizes from  $\frac{1}{16}$ " to  $\frac{1}{2}$ "



## ASSURES...

### Speedier Delivery of a Better Product

● Straight shanks—Straight flutes. Ground all over to accurate decimal tolerances. That's why these reamers mean smoother holes—eliminate the necessity of lapping—and give such long, continuous service. The cutting edges, of tested high speed tool steel ream clean—stay keen. Built by reamer specialists to precise, exacting standards—in a plant devoted solely to the production of small dimension reamers—insures your getting a top quality product, at top production speed. Average deliveries in from 30 to 40 days. Available in sizes from  $\frac{1}{16}$ " to  $\frac{1}{2}$ "—special types, including hand, stepped and piloted reamers, to order. If you want finer small dimension reamers—faster—

WRITE . . . WIRE . . . OR PHONE

## Metal Cutting Tools and Manufacturing Company

11121 Grand River Avenue • Detroit, Michigan

Telephone HOgarth 9164

★ ★ ★ BUY WAR BONDS ★ ★ ★

# Knock Out



## EXPANDING MANDRELS

*Are in a  
Class by  
Themselves*

### K-O

## EXPANDING MANDRELS

are made of high quality steel, hardened and ground. Accuracy of less than .001" is maintained for the life of the mandrel. Size ranges will accommodate work from  $\frac{3}{8}$ " to  $5\frac{1}{2}$ ". K-O mandrels can be purchased singly or in convenient sets with metal boxes.

## KNOCK-OUT

K. O. LEE COMPANY,  
Aberdeen, South Dakota

Gentlemen: Please send me bulletin No. M-42-M.

Name \_\_\_\_\_

Company \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_



....finer and faster!



Geared to high speed and fast action, America's new tank-busters rip into the enemy's crack tank columns, smashing their most powerful tanks and putting them to rout. Not once, but many times during the past few months has this happened. These tank-busters depend greatly upon accurately made gears for their speed and performance. Such gears can be accurate only when checked against precision-built master gears.

VINCO Master Gears are carefully controlled through all stages of manufacture from design to final inspection. They represent the ultimate in the art of precision manufacture of spur, helical and worm gears.

VINCO's long experience in precision is at your service in the solution of your war or post-war production problems.

**VINCO CORPORATION**

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MILLIONTHS OF AN INCH FOR SALE BY **VINCO**

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# Truly Universal Tapping Machines

offer you many advantages!

For tapping jobs that require unusual accuracy and a high rate of production—or for a set-up that involves a wide range of sizes, materials and shapes—this new PROCUNIER "Universal" Tapping Machine is ideal.

All adjustments can be made quickly and easily—such as regulating compensating spring pressure, setting depth stop, changing to any of the four speeds from 390 to 2050 RPM, or adjusting turning or flow of tap lubricant. Extra long compensating springs assures uniform tapping and reversing pressure *independently* of operator. Tap establishes its own lead for greater accuracy. Automatic tap lubricator provides abundant supply exactly when needed. Motor-driven continuous flow lubricant pumps also available. Has exclusive Procunier high-speed tapping head with double-cone friction clutch and TRU-GRIP tap holder which has many advantages. Many other features.

## SEND FOR BULLETIN

giving full details and prices on Procunier Universal Tapping Machines, High Speed Tapping Head and Tru-Grip Tap Holder.

# PROCUNIER

## For Faster, More Accurate Tapping

### PROCUNIER SAFETY CHUCK COMPANY

12 S. Clinton St., Chicago, Ill.

Send me bulletins on: ☐ High Speed Tapping Heads  
☐ Tru-Grip Tap Holders ☐ Universal Tapping Machines.

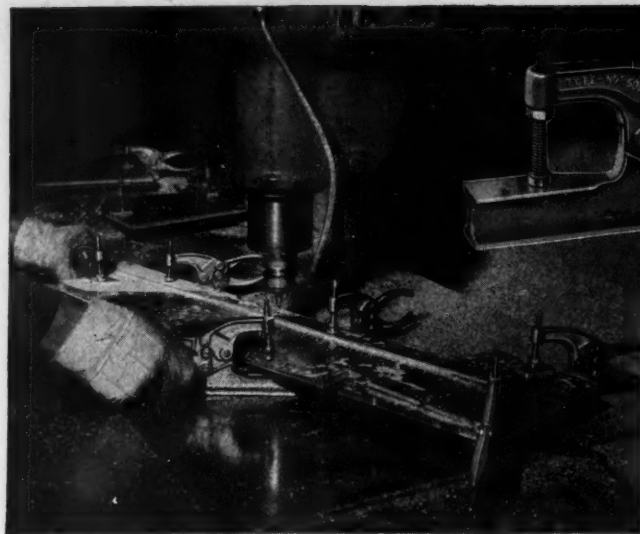
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**MAIL THIS  
COUPON TODAY**



**IT'S EASY TO GUIDE A STACK  
OF METAL SHEETS UNDER A ROUTER**  
*when using*  
**KNU-VISE PLIERS**

**MODEL KL-500**

With the lower jaw shaped like an anvil, these pliers can securely hold a stack of metal sheets together for routing operations. The top and base are wide and flat (ground within .001 inch in accuracy), and enable operator to steer work around with great ease.

Let us tell you how we are helping manufacturers simplify operations where clamping is involved.

**BUY WAR BONDS**

**KNU-VISE**

INCORPORATED

**2201 Eighth St., Detroit, Mich.**  
4328 San Fernando Rd., Glendale, Calif.



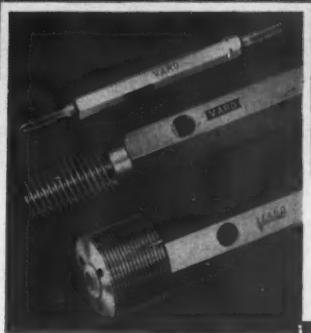
## VARD PLUG GAGES

The War isn't half over. These next months need your maximum output.

Check all internal threads with accurate plug gages and avoid rejections.

VARD makes and stocks hundreds of sizes of threaded and cylindrical plug gages from No. 0-80NF. to 12-inch diam. in NF., NC., NS., Acme, Metric and special pitches.

VARD gages are long wearing, high precision tools. Write for a catalog and price list today.



**VARD INC.**  
PASADENA, CALIFORNIA



More production per hour on shearing long sheets is made possible by the advanced design of 16, 18 and 20 foot Niagara Power Squaring Shears. Features include accurate, flat cutting; convenient handling of stock and offcut; more working strokes per hour; instant acting 14-point engagement sleeve clutch; gears mounted between anti-friction bearings; clutch and gears operate in oiltight case; self measuring, ball bearing, parallel back gage. Write for Bulletin 72, Niagara Machine & Tool Works, 637-97 Northland Avenue, Buffalo 11, N. Y. District Offices: Cleveland, Detroit, New York.

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory re-grinding service by the same skilled men who grind new Niagara knives.

**BUY UNITED STATES WAR BONDS AND STAMPS**

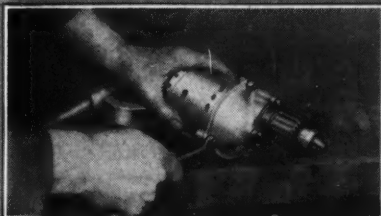
# Three More Simple Check-Ups

## THAT HELP TO KEEP CP UNIVERSALS IN CONTINUOUS SERVICE

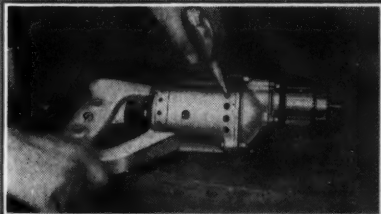


Keeping a drill, grinder, nut runner, screw driver or other CP Universal Electric Tool in continuous service is largely a matter of simple, preventive maintenance — because CP Universals are distinctly production tools, designed and built for steady, hard service. The three simple precautions illustrated on this page (and the periodic lubrication featured in a previous advertisement) will help you get maximum service from all models of CP Universal Electric Tools.

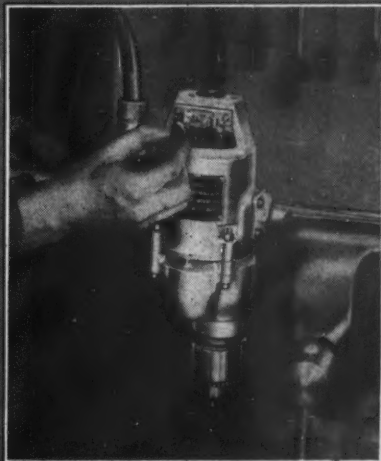
### HOW TO GET MAXIMUM SERVICE FROM CP UNIVERSAL ELECTRIC TOOLS



Check all screws, bolts, and nuts. Be sure they are tight before putting tool into service.



Keep ventilation openings free of dirt. They should be blown out regularly, with air hose.



Inspect brushes every 200 hours. If worn, replace with CP brush, the right grade for long life of brush and commutator.

\*\*\*\*\*  
PNEUMATIC TOOLS  
ELECTRIC TOOLS  
(Nicycle...Universal)  
ROCK DRILLS

CHICAGO PNEUMATIC  
TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

\*\*\*\*\*  
AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES

*A real*  
*production* **GO GETTER!**



**for**

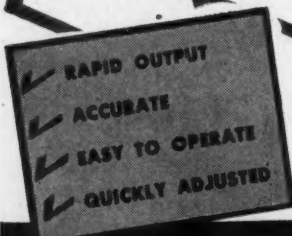
**Cold Bending of Lightweight  
BARS • PIPING • TUBING**

The exceptional speed, ease of control and versatility of the Buffalo "No. 00" Pinch-Type Bending Roll make it an ideal production tool on a wide variety of spiral and cylindrical bending operations. Difficult forms are readily handled. Since this machine works cold stock, preheating and retempering are eliminated. Overall construction is matched to heavy-duty service. Adjustments for each type of work can be quickly made. Full details in Bulletin 352-A. Write:

**BUFFALO FORGE COMPANY**

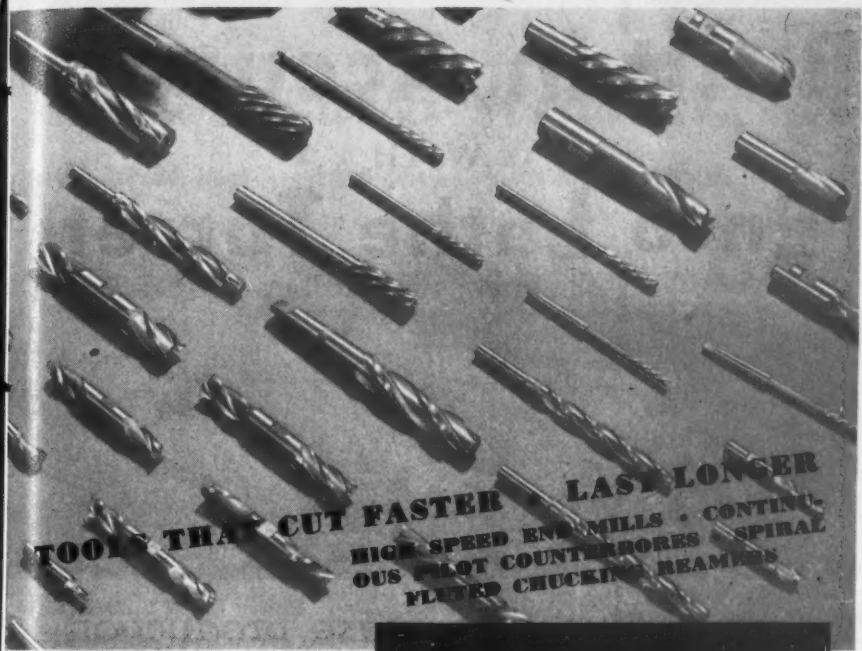
**388 Broadway, Buffalo, N. Y.**

Canadian Blower & Forge Co., Ltd.,  
Kitchener, Ont.



*"Buffalo"*

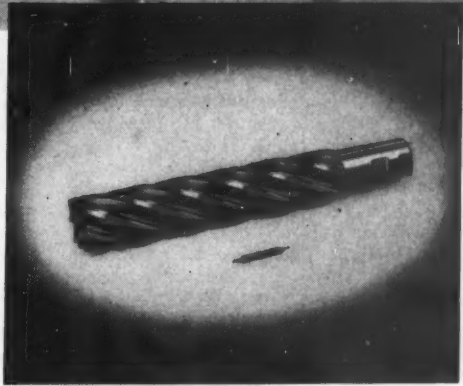
**PINCH TYPE  
BENDING ROLL**



**TOOL THAT CUT FASTER • LAST LONGER**  
 HIGH SPEED END MILLS • CONTINUOUS FLUTE COUNTERBORES • SPIRAL FLUTED CHUCKING REAMERS

## LARGE or SMALL PUTNAM END MILLS

Whether of 1/16" diameter or sizes up to the largest end mills made, all Putnam Hi-Speed End Mills permit maximum speed and feed. In addition, manufacturing and heat treating methods assure unusually long, trouble-free service. It is by actual use on your toughest milling jobs that you can prove to your own satisfaction that the end mills which do "cut faster and last longer" are produced by Putnam.



**MANY PUTNAM END MILLS ARE NOW AVAILABLE FROM STOCK. CALL YOUR PUTNAM REPRESENTATIVE FOR DETAILS.**

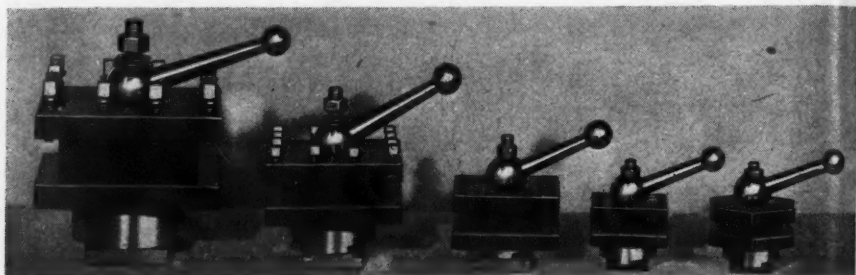


**PUTNAM TOOL COMPANY**  
 2981 Charlevoix Ave. • Detroit 7, Michigan

# Built in Accuracy

WITH

# Enco Lathe Turrets



*Save time --- Increase production*

## "ENCO" Turret Tool Posts

ENCO Turret Tool Posts are easily operated and easily maintained. Mount rigidly in T-slot of compound. Indexing is easy and positive and turret keeps setting accurately. Numerous users of our turret tool posts are holding limits of .001 plus or minus, without the use of micrometers. 12 position indexing enables the compound to be set at any angle. Carburized hardened steel construction. When ordering, specify make of lathe, swing and maximum tool size used.

- Model S**—Four tool 8 position 2½" square  
—takes up to ⅜" tool.....\$23.00
- Model H**—Six tool 12 position 3" hexagon  
—takes up to ⅜" tool.....\$25.00
- Model 3½-S**—Four tool 12 position 3½" square—takes up to ½" tool.....\$35.00
- Model 4-S**—Four tool 12 position 4" square—takes up to ⅝" or ¾" tool....\$49.50
- Model 6-S**—Four tool 12 position 6" square—takes up to 1" or 1¼" tool or 1⅝" tool holder for ¾" bit.....\$99.00

## "ENCO" Tailstock Turrets

The ENCO Tailstock Turret increases the normal tool capacity of your lathe six times. Its positive indexing mechanism tapered and hardened means accurate centering of all tools each time they are indexed for use. In the ENCO your tools are mounted in tool holes bored to close limits after assembly.

- Model A**—2½" dia. with No. 1 or No. 2 Morse Taper Arbor and six bored ⅝" tool holes .....\$18.50

- Model B**—5" dia. with No. 2 or No. 3 Morse Taper Arbor and 6 bored ⅞" holes; or with No. 4 Morse Taper Arbor and 6 bored 1" tool holes.....\$32.50

- Model B-1**—5" dia. with 1" straight shank and 6 bored 1" tool holes for use on Turret Lathes .....\$37.50

ORDER FROM ENCO DEALER OR WRITE TO US FOR NAME OF NEAREST ENCO DEALERS

**ENCO MFG. COMPANY • Dept. G**

3321-23 Montrose Avenue, Chicago 18, Illinois

# LIPE *Carbo-Matic* Lathe

Rough-Turned, Heat-Treated 3" Shell Forgings Are Now Finish Turned  
to .0005" in One Pass with a .090" Cut and a .010" Feed.

★ Designed and built for today's higher production schedules, tougher alloys, closer tolerances and especially for the "hogging" cuts of cemented carbide tools. Ruggedness, coupled with the smooth-flowing drive of cone-worm gears, assures unusually high precision and finish at faster speed with less tool wear and breakage.

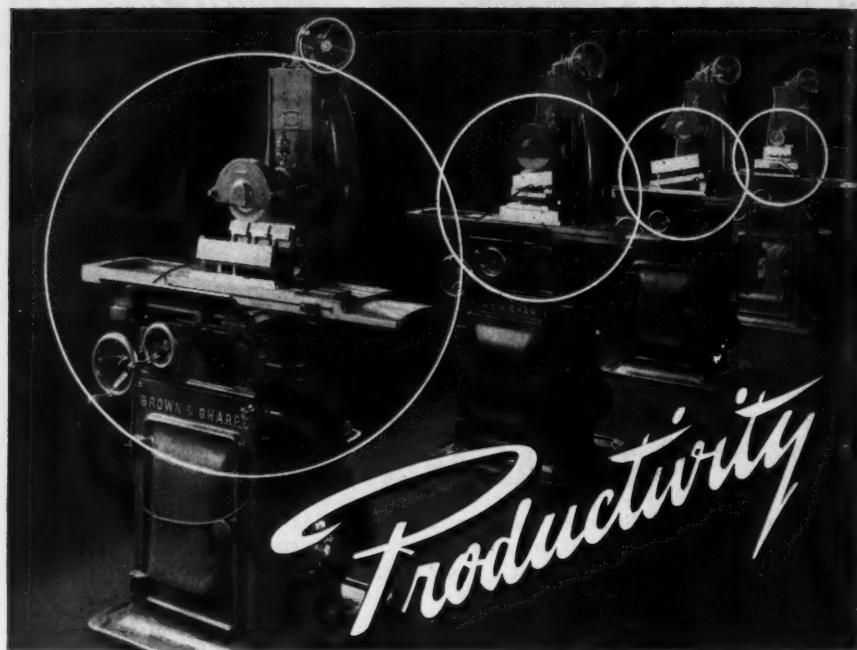
Automatic, Hydraulic  
feeding equipment, feeds,  
tailstock quill.



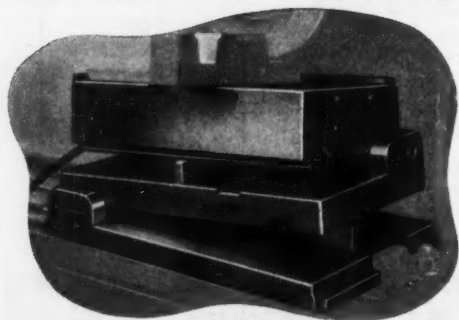
**LIPE - ROLLWAY CORPORATION**

SYRACUSE, N. Y.

# ANGULAR GRINDING



## INCREASED MANY TIMES OVER WITH MAGNA - SINES



A Magna-Sine should be available for every machine on which an average volume of angular grinding work is done.

The Magna-Sine saves valuable minutes—or possibly an hour or more—when any individual angular set-up is required. Multiplying this saving of time by the number of jobs on various grinders, you find the means to get many additional **PRODUCTIVE HOURS** from your equipment. No other chuck or similar device offers the precision accuracy of the Magna-Sine in grinding work requiring either single or compound angles.

WRITE FOR FULL INFORMATION.  
**The MAGNA-SINE**

### ROBBINS ENGINEERING COMPANY

318 MIDLAND AVENUE

DETROIT 3, MICHIGAN

TOOL E

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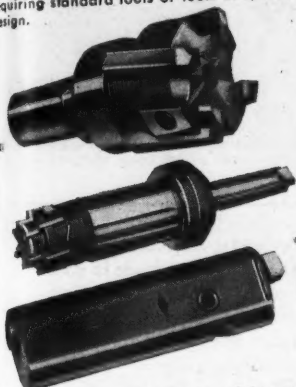


*Faster,  
Finer Finish..  
... Precision Holes  
with*

## WETMORE TOOLS

### TOOL ENGINEERING SERVICE

Designers and tool engineers are invited to avail themselves of our consulting service in reaming and boring operations, whether requiring standard tools or tools of special design.



The two illustrations at the top of the page are Wetmore standard boring bar and adjustable heavy duty reamer. In panel: Extra heavy duty reamer ... special reamer for two operations ... standard cutting tool unit for boring bar.

Do you have the Wetmore Reamer Book, illustrating standard and special setups? Ask for Catalog 36A.

ON the basis of production savings, Wetmore Reamers and Boring Bars have proved in industry that quality tools are the most economical. And in these days with manpower and machine capacity at a premium, it is even more important to turn out precision work, with finer finish, in less time.

Wetmore tools speed up machining, cut manhours per piece, last longer, and reduce setting time and maintenance; by a combination of engineering features found in no other reamers and boring bars.

Rigid construction with patented blade lock and extra heavy blades in Wetmore Reamers insure better finish, without digging in or chatter ... work is held to close tolerances because threads are milled on centers, blade seats ground true with threads and blades are always bottomed ... blades are quickly and accurately set to the thousandths of an inch ... blades may be set out 7 to 50 times, depending on size ... tools are interchangeable, because of Wetmore precision inspection ... and heavier cuts may be taken because of rugged construction, scientific grinding and quality materials.

Top-flight metal working plants have found Wetmore Reamers and Boring Bars the answer to production problems.

Let us show you how they can solve yours



## REAMERS and BORING BARS

**WETMORE  
REAMER COMPANY**  
418 North 27th Street, Dept. E  
Milwaukee, Wisconsin

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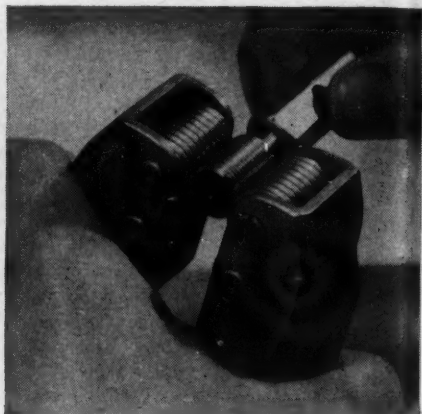
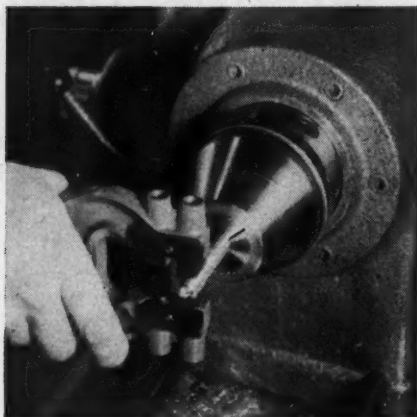
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# Taft-Peirce Announces

## A COMPLETE LINE OF ROLL THREAD\* AND ADJUSTABLE THREAD SNAP GAGES

(\*Licensed under the John-Sons patents)



To its well-known line of *Adjustable* Thread Snap Gages, Taft-Peirce announces the addition of a full line of *Roll* Thread Snap Gages . . . continuing the T-P policy of providing a complete line of gages for every preference and purpose.

These two types of Thread Snap Gages are used for the great majority of thread-measuring applications. Each type is accurate and effective, having its own advantages and advocates. Consult with Taft-Peirce engineers on the type best suited to *your* work . . . or write for new illustrated bulletin on the complete Taft-Peirce line of Thread Snap Gages.



Style 9432 Adjustable Thread Snap Gages are made in sizes from  $\frac{1}{4}$ " to 4", in any pitch desired. Adjustable over a range from  $\frac{1}{4}$ " to  $\frac{1}{2}$ ", depending on size.

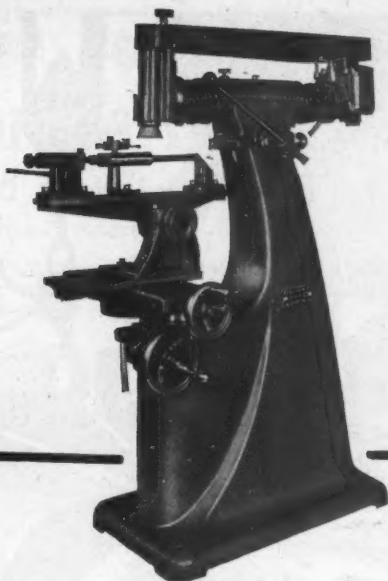


Style 9435 Roll Thread Snap Gages are made in two styles . . . the closed-face type for general work, and the open-face type for use when the thread runs up to a shoulder.



**The TAFT-PEIRCE Mfg. Co.**  
**Woonsocket, Rhode Island**

An  
**"ACE"**  
 FOR THE BATTLE  
 OF PRODUCTION



*Oliver "ACE"*  
*Universal*  
*Tool and Cutter*  
*Grinder*

**Don't Neglect  
 Your Toolroom  
 It's the Backbone  
 of Production!**

Keeping tools in condition to turn out maximum production is a big part of the battle on America's industrial front. An "ace" for this job is the Oliver Universal Tool and Cutter Grinder. Versatile, fast and accurate, it is capable of producing mathematically correct cutting teeth and edges on a wide range of milling cutters, end mills, saws, reamers, hobs and special tools. The Oliver principle of tool grinding is the reason for the increased speed and wide range of the ACE; the tool is held stationary and the grinding wheel traverses the work. This method permits the use of the simplest of fixtures, only two of which are necessary to grind the majority of tools. The wheel has a stroke of 10" through a rack and gear and a 13" bearing, all fully protected from dust and grit. Tool efficiency will help to win the battle of production! Keep your tools accurate and fast cutting ... lengthen their useful life by sharpening them on Oliver Tool Conditioners.

**OLIVER INSTRUMENT CO.**

1410 E. MAUMEE ST.

ADRIAN, MICHIGAN

**Oliver**  
 OF ADRIAN

AUTOMATIC DRILL GRINDERS—TOOL  
 AND CUTTER GRINDERS—DRILL  
 POINT THINNERS—TEMPLATE  
 TOOL GRINDERS—FACE MILL  
 GRINDERS—DIEMAKING MACHINES



## DUST CAN BE AN UNSEEN DANGER, TOO!

Like Axis submarines lurking in our convoy lanes to strike at the life lines of supply, DUST can slow down, even stop the production lines of Industry. But—just as the hazards of raiding U-boats can be effectively checked by our fighting ships, so can the danger of dust be controlled in war production plants. Spoilage, rejects, do-overs, caused by atmospheric and process dusts can be largely eliminated with AAF dust control.

The American Air Filter Company has developed through 22 years of research and experience, dust control equipment to meet every industrial need. If you have a troublesome dust problem, our engineers are available without obligation to help you.



**AMERICAN AIR FILTER COMPANY, INC., 100 CENTRAL AVE., LOUISVILLE, KY.**

IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q.

# PROMPT DELIVERY Tungsten Carbide Tipped Tools

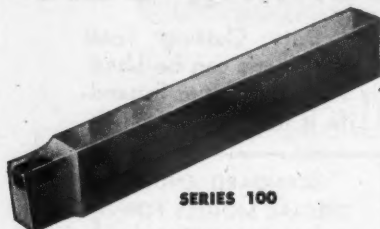
Price \$1.00 Each In Any Size

**New Low Prices—Increase Production—Cut Operating Costs**

Tools are tipped with Tungsten Carbide, and are suitable for machining cast-iron, brass, bronze, aluminum, non-ferrous materials (such as hard rubber, bakelite, fibre), and tough alloy steels up to 500 Brinell hardness.

## Left—100 Series

Left Hand-Reverse Image, Right Hand Shown

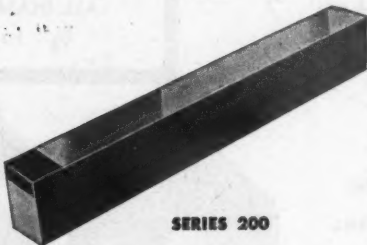


SERIES 100

| Tool No. RH | LH    | Shank Size   |
|-------------|-------|--|
| R-100       | L-100 | $\frac{1}{4} \times \frac{1}{4} \times 2$              |
| R-101       | L-102 | $\frac{5}{16} \times \frac{5}{16} \times 2\frac{1}{4}$ |
| R-103       | L-104 | $\frac{3}{8} \times \frac{3}{8} \times 2\frac{1}{2}$   |
| R-105       | L-106 | $\frac{7}{16} \times \frac{7}{16} \times 3$            |
| R-107       | L-108 | $\frac{1}{2} \times \frac{1}{2} \times 3\frac{1}{2}$   |

## 200 Series

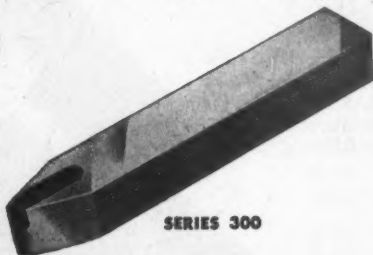
| Tool No. | Shank Size   |
|----------|--|
| 200      | $\frac{1}{4} \times \frac{1}{4} \times 2$              |
| 201      | $\frac{5}{16} \times \frac{5}{16} \times 2\frac{1}{4}$ |
| 202      | $\frac{3}{8} \times \frac{3}{8} \times 2\frac{1}{2}$   |
| 203      | $\frac{7}{16} \times \frac{7}{16} \times 3$            |
| 204      | $\frac{1}{2} \times \frac{1}{2} \times 3\frac{1}{2}$   |



SERIES 200

## Below— 300 Series

| Tool No. | Shank Size   |
|----------|--|
| 300      | $\frac{1}{4} \times \frac{1}{4} \times 2$              |
| 301      | $\frac{5}{16} \times \frac{5}{16} \times 2\frac{1}{4}$ |
| 302      | $\frac{3}{8} \times \frac{3}{8} \times 2\frac{1}{2}$   |
| 303      | $\frac{1}{2} \times \frac{1}{2} \times 3\frac{1}{2}$   |



SERIES 300

## STANDARD TUNGSTEN CARBIDE TIPPED TOOL BITS

In lots of 12 assorted in any Series; 100-200-300 Series an extra 10% will be allowed; also in lot of 50 assorted 20% discount will be allowed.

Sizes not listed as well as special TIPPED TOOLS will be quoted upon request. When ordering, state tool number and quantity desired.

We Carry Silicon Carbide Emery Wheels for Grinding Tungsten Carbide Tool Bits.

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251 CENTER STREET Phone: CAnal 6-5575 NEW YORK, N. Y.

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Are Saving Time and Lowering Costs with**

# **STATE**

## **Boring and Reaming Bars**

**Because—**With STATE'S Heavy Duty Cutting Tools  
Faster Speeds and Heavier Feeds can be Used.  
—With STATE'S Quickly Adjusted Super-Expanding  
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SPECIAL MODELS FOR  
ALL DIAMETERS  
 $\frac{7}{8}$ " to 6"

**BORING AND  
REAMING BARS**

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**STATE MFG.  
AND CONSTRUCTION COMPANY**  
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# LONG LENGTH HIGH SPEED DRILLS

9" Cutting Flute

12" Long



**Prompt Delivery**

| Size<br>Inches | Length Overall<br>Inches | Length of Flute<br>Inches | Our Price<br>Net Each<br>High Speed |
|----------------|--------------------------|---------------------------|-------------------------------------|
| 3/16           | 12"                      | 9"                        | 3.00                                |
| 13/64          | 12                       | 9                         | 3.25                                |
| 7/32           | 12                       | 9                         | 3.25                                |
| 15/64          | 12                       | 9                         | 3.25                                |
| 1/4            | 12                       | 9                         | 3.50                                |
| 17/64          | 12                       | 9                         | 3.50                                |
| 9/32           | 12                       | 9                         | 3.50                                |
| 19/64          | 12                       | 9                         | 3.50                                |
| 5/16           | 12                       | 9                         | 3.75                                |
| 21/64          | 12                       | 9                         | 3.75                                |
| 11/32          | 12                       | 9                         | 3.75                                |
| 23/64          | 12                       | 9                         | 3.75                                |
| 3/8            | 12                       | 9                         | 4.00                                |
| 25/64          | 12                       | 9                         | 4.00                                |
| 13/32          | 12                       | 9                         | 4.25                                |
| 27/64          | 12                       | 9                         | 4.25                                |
| 7/16           | 12                       | 9                         | 4.50                                |
| 29/64          | 12                       | 9                         | 4.75                                |
| 15/32          | 12                       | 9                         | 4.75                                |
| 31/64          | 12                       | 9                         | 5.00                                |
| 1/2            | 12                       | 9                         | 5.00                                |

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MACHINE WORK • CASTINGS • HEAT-TREATING  
FORGINGS • EMPLOYMENT • BUSINESS • ETC.**

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*Estimates on Request.*

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increased facilities  
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**GEARS  
THREADS**

**CAMS  
SPINES**

Excellent facilities for grinding  
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on a contract basis.

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Hartford, Conn.

## CENTERLESS GRINDING

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ground if necessary. Improved and expanded  
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*Send blueprints or samples for estimates.*

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## A COMPLETE PRECISION GRINDING SERVICE

CENTERLESS GRINDING  
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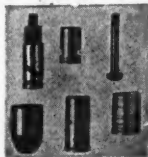
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**Hand Screw Machine Products**  
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PRODUCTION MILLING ON DUPLICATE  
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MACHINES.

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Teeth Cut To Your Specifications.  
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"Toolife" Cutting Oil Agents wanted throughout U. S. for specialized sulphurized and nonsulphurized compounds—increased tool life over 20% proven—no dermatitis—must be acquainted with trade—state experience, details. Box 82, Modern Machine Shop, 431 Main Street, Cincinnati 2, Ohio.

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POST WAR**

**MECHANICAL OR CHAIN STORE  
VOLUME SALES ITEMS**

Long established manufacturer of Brass, Bronze, Aluminum, Zamak and other non-ferrous Die Castings in Los Angeles, now producing Airplane Parts and Combat Materials, seeks items to be manufactured Post War, on royalty basis. Has fine facilities for engineering and development work, if necessary, and will finance and merchandise, if desirable. Write Box No. 81, MODERN MACHINE SHOP, 431 Main St., Cincinnati 2, Ohio.

**WANTED  
A PRODUCT  
To Manufacture**

We engineer and manufacture tools, gages, fixtures, and do close precision machine work. We prefer a product that has both a present and post-war market.

Well financed, experienced, with a sales organization calling on automotive manufacturers and jobbers nationally.

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**WANTED  
Mechanical Draftsmen**

For machine and tool design. Machine tool experience preferred.

Company wants men for war work today who will stay with company in postwar period.

Pleasant, midwestern town, low living costs, modern plant.

Address replies to 1454 Guildhall Building, Cleveland, Ohio.

**SALES AGENTS WANTED**

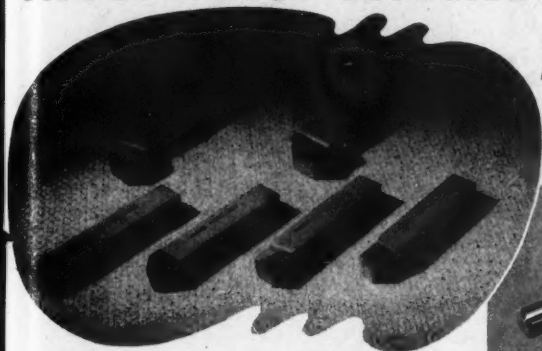
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Manufacturers of  
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## LET THE EXPERTS DO THE JOB!



*These* ARE THE CEMENTED-CARBIDE  
TIPPED TOOLS SUPPLIED AS  
*Standard*  
BY  
CARBIDE  
FABRICATORS



**48 HOUR DELIVERY**  
ON TURNING TOOLS SHOWN ABOVE

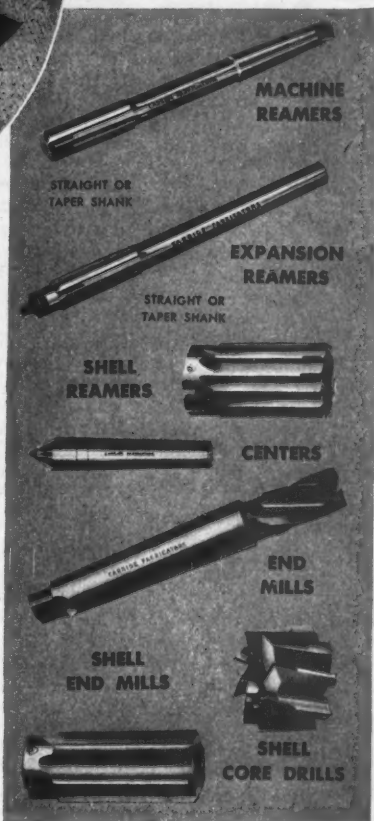
The wear resistance of cemented-carbides is available to you in many different types of standard tools manufactured by Carbide Fabricators.

The standard turning tools shown above—ground ready for use and which also meet many requirements for boring and facing jobs—are produced in large volume to be carried in stock. Simplified pricing of these tools makes possible one low unit price regardless of the number of tools which are ordered.

Reamers, end mills and core drills are all produced to a high degree of accuracy. Machine reamers, shell reamers, end mills and shell core drills are held to size within a total tolerance of .0005". When specified, closer tolerances can be supplied at a slight additional charge.

Complete information on any of these tools will be supplied immediately upon request.

We are authorized suppliers of Carboloy, Vascoloy-Ramet and Firthide cemented-carbides.



*Carbide Fabricators Co.*

ROYAL OAK  
MICHIGAN

MEMBERS OF STANDARD AND SPECIAL CEMENTED CARBIDE TIPPED TOOLS

# The Last Word . . .

**H**ISTORY was made when a Federal Grand Jury, on July 26th, indicted 30 persons on a charge of conspiracy and of having fomented strikes in the recent unauthorized work stoppages in Pennsylvania coal fields. The indictments followed almost two weeks of investigation by the grand jury, after steel production had dropped because of a lack of coal to fire the blast furnaces, as to the reasons why more than 12,000 miners were still idle.

That authority entails responsibility is axiomatic. Organization by the members of a craft or profession is unquestionably a good thing, as long as the members employ the advantages of such fellowship for the advancement of the craft and co-operation with employers or the public. In many cases craft organizations have earned the respect of employers and others by the educational effort and improved service that has developed within their ranks. But, sadly enough, in many other cases the workers have organized simply for the purpose of forcing high wages, short hours, and various privileges through holding the "strike" club over the heads of their employers.

Such organizations have assumed the authority to control the operation of their employers' properties without likewise assuming responsibility for the quality of workmanship, for quantity of production commensurate with the wages received, or for cooperating in the operation of their organizations to the best interests of the community.

In the present instance, coal miners have stopped the production of coal in order to enforce a demand for an increase

in their pay. Considering the fact that their pay has been increased in proportion to the increase in the cost of living, their situation is not critical. But in stopping the production of coal, they also stopped the production of steel and therefore the production of guns, and ships, and airplanes, and other fighting materials.

Our country is fighting a war—the most critical war of its entire career. The fate of the Nation depends upon the outcome of this war; whether we win or lose determines whether or not our country shall be over-run by armies of raping, pillaging, murderous heathen. In a heroic effort to prevent such a catastrophe, thousands of American boys are dying in the Pacific, in Africa, and in the jungles and fox-holes of the Solomon and Aleutian Islands. And in the face of such a crisis 12,000 coal miners sabotage the production of war materials because they want more pay. They should have a Hitler over them for just one day; they would be glad to mine coal—if they lived to have another chance.


It appears that the government is taking action in the present case because the mines were in the possession of the United States Government. The labor laws in effect at the present time make it possible to force an employer to show cause if he discharges an employee, without placing an equal amount of responsibility on the employee or his organization. Regardless of who the employer may be—government or private individual—employees' organizations should be subject to the same control as the employers. Until that situation prevails, the employer is not getting a fair and square deal.

*Howard Campbell*

# Keep this Point in Mind

## FEATURES of SUPERIORITY

Simple Design . . . Precision-Built . . . Heavy Duty Ball Bearing  
for Greater Thrust Load . . . Heavy Duty Roller Bearing for  
Greater Radial Load . . . Needle Bearing for True Running . . .  
Large Spindle . . . Small Head . . . Short Overhang . . . Locking  
Feature for Redressing Point without Disassembling . . . Lubricated—with Oil Seal Lubricant Retainer . . . Lock Thrust Pad  
Compensator for Expansion of Work.

**MOTOR TOOL**  **LIVE CENTERS**

are as nearly FRICTION-FREE as scientific  
engineering can make them

Chances are you will wear out a dozen "dead" centers before you even  
have to dress the point of a MOTOR TOOL. And, in a MOTOR TOOL,  
there still are years of service if run at rated loads and speeds.

a vital point to keep in mind when buying centers

**MOTOR TOOL MANUFACTURING CO.**  
**METAL CUTTING TOOLS**

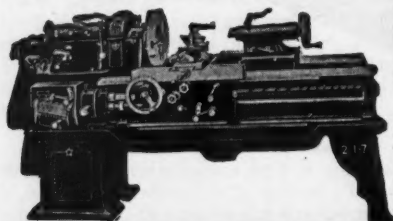
7771 CORTLAND AVENUE • DETROIT, MICHIGAN

*Make it a Rule  
to Call Motor Tool*

# CINCINNATI QUICK-CHANGE GEARED-HEAD MOTOR-DRIVEN LATHES

**Guaranteed for Workmanship, Materials and Performance**

They need no introduction to experienced machine shop men. Their many exclusive features enable the operator to reduce operating expenses and more than earn their cost in a short time. Our close co-operation with many of the leading plants everywhere has helped solve perplexing lathe problems for boring, turning or chasing any metal work always most economically.

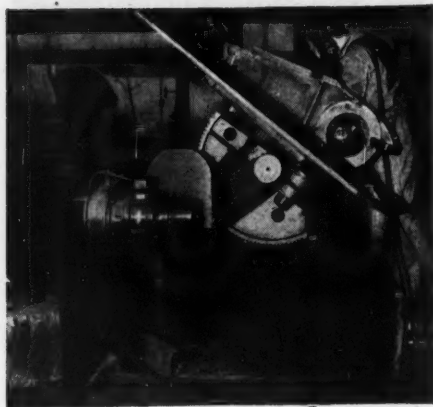


Latest catalog contains detailed specifications on 14", 16", 18", 20", 22", 24", 27" and 30" sizes. With them are obtainable 32 to 96 changes of thread and feed; 12 to 24 spindle speeds by simply lifting the lever to cover every shop requirement. Whether in tool room or manufacturing plants, CINCINNATI LATHES give most remarkable performance.

**Designed and produced by specialists  
since 1906.**

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OAKLEY, CINCINNATI, OHIO



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## **C-F POSITIONERS**

### **Speed Production & Job Welding**

C-F Positioners make welding a faster and more economical operation—save time, save man-hours. The welder himself turns and tilts and positions even the clumsiest and heaviest weldments with a push button control—without cranes, crane crews, hoist, jacks or "flopping" space. All sides can be welded down-hand—all welds can be made faster with heavier rods; made stronger, smoother and flawless.

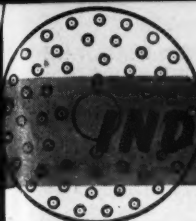
C-F Positioners come in sizes and types for every welding need — range from small hand operated units for light job work to giant positioners that swing great weldments weighing 30,000 lbs. All have platforms that rotate the full 360° and tilt to 135° beyond horizontal. All are adjustable for height and are pedestal mounted to give greatest floor clearance.

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# INDEX TO ADVERTISEMENTS

|   |          |
|---|----------|
| Abart Gear & Machine Co.                              | 311      |
| Abrasive Machine Tool Co.                             | 88       |
| Ace Manufacturing Corp.                               | 232      |
| Acme Diamond Tool Co.                                 | 274      |
| Acme Industrial Co.                                   | 315      |
| Acme Machine Tool Co.                                 | 107      |
| Acme Tool Co.   | 279      |
| Acromark Co., The                                     | 354      |
| Advance Machine Works                                 | 348      |
| Agat-Detroit Manufacturing Co.                        | 306, 309 |
| Air Reduction Sales Co.                               | 63       |
| Albertson & Co., Inc.                                 | 219      |
| Alco Tool Co.   | 44       |
| Almond Manufacturing Co., T. R.                       | 333      |
| American Air Filter Co.                               | 390      |
| American Metal Hose Branch,<br>American Brass Co.     | 173      |
| American Cutter & Engineering Co.                     | 364      |
| American Emery Wheel Works                            | 21       |
| American Gauge Co.                                    | 283      |
| American Machine & Metals Corp.,<br>Tolhurst Division | 131      |
| American Measuring Instruments Corp.                  | 290      |
| American Metal Works, Inc.                            | 230, 294 |
| American Pipe Bending Machine Co., Inc.               | 164      |
| American Screw Co.                                    | 147      |
| American Swiss File & Tool Co.                        | 289      |
| American Tool Works Co.                               | 137      |
| Ames Co., B. C.                                       | 356      |
| Anderson Bros. Mfg. Co.                               | 262      |
| Arguto Oilless Bearing Co.                            | 332      |
| Armstrong-Blum Mfg. Co.                               | 185      |
| Armstrong-Bray & Co.                                  | 276      |
| Armstrong Bros. Tool Co.                              | 116      |
| Armour Sandpaper Works,<br>Div. of Armour & Co.       | 265      |
| Arter Grinding Machine Co.                            | 93       |
| Atkins & Co., E. C.                                   | 153      |
| Atlantic Saw Mfg. Co.                                 | 282      |
| Atlas Press Co.                                       | 102      |
| Auto Engraver Co.                                     | 236      |
| Automatic Machine & Tool Co.                          | 341      |
| Automotive Maintenance Machinery Co.                  | 58       |
| Auto Moulding & Mfg. Co.                              | 330      |
| Auto-Ordinance Corporation                            | 199      |
| Avey Drilling Machine Co.                             | 22       |
| Baker Brothers, Inc.                                  | 218      |
| Bakewell Manufacturing Co.                            | 78       |
| Bartelt Engineering Co.                               | 297      |
| Bath & Co., Inc., John                                | 64       |
| Baumbach Manufacturing Co., E. A.                     | 326      |
| Bay State Abrasive Products Co.                       | 91       |
| Bear Mfg. Co.   | 317      |
| Behr-Manning Corporation                              | 181      |
| Berkeley Equipment Co.                                | 325      |
| Besly & Co., Charles H.                               | 75       |
| Beverly Shear Co.                                     | 262      |
| Bissett Steel Co.                                     | 311      |
| Black Drill Co.                                       | 267      |
| Blanchard Machine Co.                                 | 85       |
| Bogzis & Co., H. P.                                   | 180      |
| Boyar-Schultz Corporation                             | 333      |
| Boye & Emmes Machine Tool Co.                         | 254      |
| Bradford Machine Tool Co.                             | 62       |
| Brady-Penrod, Inc.                                    | 293      |
| Brewster-Squires Co.                                  | 309      |
| Bridgeport Machines, Inc.                             | 68       |
| Bristol Co., The                                      | 132, 147 |
| Brown & Sharpe Mfg. Co.                               | 145, 256 |
| Brown Corporation, W. R.                              | 232      |
| Brown Engineering Co.                                 | 186, 324 |
| Bryant Chucking Grinder Co.                           | 167      |

|                                    |               |
|------------------------------------|---------------|
| Buckeye Brass & Manufacturing Co.  | 259           |
| Buffalo Forge Co.                  | 376           |
| Builders' Iron Foundry             | 309           |
| Bullard Co.                        | 204           |
| Burke Machine Tool Co.             | 146           |
| Busch Co., J. C.                   | 192           |
| Capewell Manufacturing Co.         | 301           |
| Carbide Fabricators Co.            | 397           |
| Carboloy Co., Inc.                 | 114           |
| Carborundum Co., The               | 197           |
| Carroll-Jamieson Machine Tool Co.  | 336           |
| Catskill Metal Works, Inc.         | 300           |
| Central Screw Co.                  | 147           |
| Cerro de Pasco Copper Corp.        | 329           |
| Champion Diamond Co.               | 83            |
| Chandler Products Corp.            | 147           |
| Chicago Pneumatic Tool Co.         | 375           |
| Chicago Rawhide Mfg. Co.           | 331           |
| Chicago Wheel & Mfg. Co.           | 148, 149      |
| Cincinnati Bickford Tool Co.       | 127           |
| Cincinnati Electrical Tool Co.     | 404           |
| Cincinnati Gear Co.                | 323           |
| Cincinnati Grinders Incorporated   | 8, 9          |
| Cincinnati Lathe & Tool Co.        | 400           |
| Cincinnati Milling Machine Co.     | 8, 9          |
| Cincinnati Planer Co.              | 6             |
| Cincinnati Shaper Co.              | 129           |
| Cincinnati Tool Co.                | 289           |
| Circular Tool Co., Inc.            | 213           |
| Cities Service Oil Co.             | 66            |
| Cleveland Pneumatic Tool Co.       | 77            |
| Cleveland Twist Drill Co.          | 179           |
| Cleveland Wire Spring Co.          | 292           |
| Colborne Manufacturing Co.         | 216           |
| Colonial Bushings, Inc.            | 350           |
| Columbian Vise & Mfg. Co.          | 214           |
| Comet Tool Co.                     | 297           |
| Commercial Centerless Grinding Co. | 350           |
| Comtor Co.                         | 319           |
| Cone Automatic Machine Co.         | 239           |
| Continental Screw Co.              | 147           |
| Corbin Screw Corp., The            | 147           |
| Cortland Grinding Wheels Corp.     | 285           |
| Coulter Machine Co., James         | 80            |
| Covel Manufacturing Co.            | 340           |
| Cratex Manufacturing Co.           | 340           |
| Criterion Machine Works            | 299, 314, 342 |
| Cross Gear & Machine Co.           | 255           |
| Cullen-Friedstedt Co.              | 400           |
| Culman Wheel Co.                   | 234           |
| Cunningham Co., M. E.              | 318           |
| Curtis Pneumatic Machinery Co.     | 247           |
| Cushman Chuck Co.                  | 277           |
| Dalzen Tool & Mfg. Co.             | 57            |
| Danly Machine Specialties, Inc.    | 235           |
| Davis Keyseater Co.                | 513           |
| Dearborn Gage Co.                  | 113           |
| Delta Manufacturing Co.            | 267           |
| DeMoss & Son, W. S.                | 350           |
| De Sanno & Son, Inc., A. P.        | 71            |
| Desmond-Stephan Mfg. Co.           | 298           |
| Detroit Bevel Gear Co.             | 352           |
| Detroit Power Screwdriver Co.      | 158           |
| Detroit Tap & Tool Co.             | 225           |
| Diamond Saw Works, Inc.            | 347           |
| Diamond Tool Co.                   | 362           |
| Dickerman Mfg. Co., H. E.          | 316           |
| Dix Manufacturing Co.              | 352           |
| Dorman Machine Tool Works          | 305           |
| Douglas Machinery Co., Inc.        | 81, 359       |
| Drels & Krump Manufacturing Co.    | 248           |
| Dremel Manufacturing Co.           | 53            |

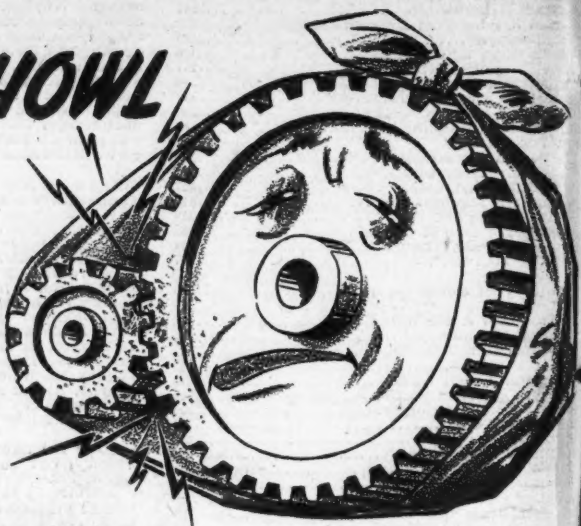


|        |                                       |               |
|--------|---------------------------------------|---------------|
| 129    | Parker-Kalon Corp.                    | 147           |
|        | Pawtucket Screw Co.                   | 147           |
| 205    | Penrod & Sons Tool & Engineering      |               |
| 17     | Co., Floyed                           | 198           |
| 20     | Perfex Gage & Tool Co.                | 125           |
| 231    | Pheoil Manufacturing Co.              | 147           |
| 372    | Phillips Manufacturing Co.            | 48            |
|        | Phillips Screw Manufacturers          | 147           |
| 257    | Pittsburgh Stamp Co., Inc.            | 253           |
| 327    | Porter-Cable Machine Co.              | 86            |
| 2      | Pratt & Whitney                       |               |
| 13     | Division Niles-Bement-Pond Co.        | 243           |
| 136    | Proconner Safety Chuck Co.            | 371           |
| over   | Production Instrument Co.             | 351           |
| 242    | Production Machine Co.                | 344           |
| 369    | Producto Machine Co.                  | 319           |
| 242    | Progressive Tool & Cutter Co.         | 288           |
| 155    | Prosser & Sons, Thomas                | 211           |
| 327    | Putnam Tool Co.                       | 377           |
| 354    |                                       |               |
| 178    | Quality Tool & Die Co.                | 195           |
| 169    |                                       |               |
| 380    | Racine Tool & Machine Co.             | 56            |
| 295    | Reading Machine Co.                   | 272           |
| 379    | Reading Manufacturing Co.             | 147           |
| 99     | Ready Tool Co.                        | 248           |
| over   | Reed Small Tool Works                 | 315           |
| 222    | Renner's Lubricating Co.              | 226           |
| 340    | Remco Products Corporation            | 320           |
| 224    | Revolver Co.                          | 311           |
| 104    | Rex Rheostat Co.                      | 238           |
| 337    | Reynolds Machinery Co.                | 322, 345      |
| 286    | Rivett Lathe & Grinder Inc.           | First Cover   |
|        | Kobbins Engineering Co.               | 386           |
| 221    | Roberts Hubber Co., Weldon            | 29            |
| 106    | Robertson Machine & Foundry Co., W.   | 335           |
| 321    | Rockford Drilling Machine Co.         | 302           |
| 38     | Rockford Machine Tool Co.             | 97            |
| 289    | Rogers & Co., S. C.                   | 313           |
| 324    | Rogers Tool Corporation, John M.      | 154           |
| 188    | Ross Operating Valve Co.              | 49            |
| 349    | Rotary File Co., The                  | 157           |
|        | Rotor Tool Co.                        | 171           |
| 346    | Russell Burdall & Ward Bolt & Nut Co. | 147           |
| 357    | Ruthman Machinery Co.                 | 182           |
| 344    |                                       |               |
| 310    | S & S Machine Works                   | 342           |
| 108    | Safety Grinding Wheel & Machine Co.   | 72            |
| 368    | Sales Service Machine Tool Co.        | 50            |
| 287    | Savage Co., W. J.                     | 244           |
| 251    | Savage Tool Co.                       | 41            |
| 261    | Sav-Way Industries                    | 37            |
| 384    | Schauer Machine Co.                   | 54            |
| 301    | Scherr Co., Inc., George              | 31            |
| 135    | Schmidt, Inc., Geo. T.                | 112, 194, 303 |
| 339    | Schultz & Anderson Co.                | 34            |
| 399    | Scovill Manufacturing Co.             | 147           |
| 238    | Sellers & Co., Inc., William          | 87            |
| 61     | Seneca Falls Machine Co.              | 23            |
|        | Services Directory                    | 394, 395      |
| 25     | Severance Tool Industries, Inc.       | 183           |
| 227    | Shakeproof Inc.                       | 147           |
| 147    | Shenley Machine Co., Inc.             | 268           |
| 230    | Shimons Machine Tool Corp.            | 15            |
| 147    | Sinclair Refining Co.                 | 33            |
| 312    | Skillsaw, Incorporated                | 187           |
| 374    | Smith & Sons, Inc., J. K.             | 142           |
| 291    | Smith Tool & Engineering Co.          | 296           |
| 228    | Snap-On Tools Corporation             | 249           |
| 133    | Sossner Tool & Machine Works, Inc.    | 52            |
| 350    | South Bend Lathe Works                | 109           |
| 45     | Southington Hardware Mfg. Co., The    | 147           |
| 339    | Spartan Saw Works, Inc.               | 353           |
| 136    | Springfield Machine Tool Co.          | 92            |
| 40     | Square Surface Plate & Tool Co.       | 335           |
| 2, 301 | Stackbin Corporation                  | 176           |
| 307    | Standard Gage Co., Inc.               | 201           |
|        | Standard Marble Works, Inc.           | 307           |
| 26     | Standard Pressed Steel Co.            | 273, 325      |
| 389    | Stanley Electric Tool Div.            | 159           |
| 343    | Star Electric Motor Co.               | 385           |
| 73     | Starrett Co., The L. S.               | 59            |
| 291    | State Mfg. & Construction Co.         | 392           |
| 147    | Steege Machinery Co., W. L.           | 334           |
|        | Sterling Factory Equipment Co.        | 351           |

|          |                                   |          |
|----------|-----------------------------------|----------|
| 280      | Stevens Inc., John B.             | 280      |
| 256      | Stevens Waiden, Incorporated      | 256      |
| 208      | Stow Manufacturing Co., Inc.      | 208      |
| 383      | Strong, Carusie & Hammond Co.     | 383      |
| 328      | Strumatic Tool Co.                | 328      |
| 67       | Sturtevant Co., P. A.             | 67       |
| 79       | Sunnen Products Co.               | 79       |
| 82       | Sun Oil Co.                       | 82       |
| 241      | Super Tool Co.                    | 241      |
| 299      | Sutton Tool Co.                   | 299      |
| 293      | Swanson Tool & Machine Corp.      | 293      |
|          | Swiss American Gear Mfg. Co.      | 293      |
| 388      | Taft-Peirce Mfg. Co.              | 388      |
| 40       | Tannewitz Works                   | 40       |
| 275      | Taylor Machine Co.                | 275      |
| 215      | Texas Co., The                    | 215      |
| 417      | Thermal Electric Mfg. Co.         | 417      |
| 46       | Thompson Grinder Co.              | 46       |
| 394      | Threadwell Tap & Die Co.          | 394      |
| 1        | Timken Roller Bearing Co.         | 1        |
| 271      | Tomkins-Johnson Co.               | 271      |
| 278      | Tool Engineering Service Co.      | 278      |
| 94       | Torit Manufacturing Co.           | 94       |
| 281      | Torg Electric Mfg. Co.            | 281      |
| 348      | Trico Fuse Manufacturing Co.      | 348      |
| 278      | Triplex Machine Tool Corp.        | 278      |
| 394      | Troyke, Alfred A.                 | 394      |
| 345      | Tru-Cut Tool Co.                  | 345      |
| 101      | Tungsten Alloy Mfg. Co.           | 101      |
| 209      | Udylite Corporation               | 209      |
| 70       | Union Twist Drill Co.             | 70       |
|          | Union Twist Drill Co.,            |          |
|          | Butterneld Division               | 160      |
| 303      | United States Drill Head Co.      | 303      |
| 35       | U. S. Tool Co., Inc.              | 35       |
| 352      | V & O Press Co.                   | 352      |
| 165      | Vanadium-Alloys Steel Co.         | 165      |
| 373      | Vard, Incorporated                | 373      |
| 382      | Vascoly-Hamet Corporation         | 382      |
| 351      | Velt Manufacturing Co.            | 351      |
| 391, 393 | Victor Machinery Exchange, Inc.   | 391, 393 |
| 323      | Victor Saw Works, Inc.            | 323      |
| 315      | Vimco Manufacturing Co.           | 315      |
| 370      | Vinco Corporation                 | 370      |
| 310      | Wade Instrument Co.               | 310      |
| 76       | Wagner Electric Corporation       | 76       |
| 208      | Walker Co., Inc., O. S.           | 208      |
| 363      | Walker-Turner Co., Inc.           | 363      |
| 307      | Walls Sales Corporation           | 307      |
| 313      | Waltham Machine Works             | 313      |
| 327      | Walton Co.                        | 327      |
| 317      | Wardwell Mfg. Co.                 | 317      |
| 18, 19   | Warner & Swasey Co.               | 18, 19   |
| 210      | Warren Industries                 | 210      |
| 332      | Watts Bros. Tool Works            | 332      |
| 226      | Waverly Petroleum Products Co.    | 226      |
| 65       | Webber Gage Co.                   | 65       |
| 252      | Webber Machine Corp.              | 252      |
| 103      | Weldon Tool Co.                   | 103      |
| 295      | Wend-Solis Co.                    | 295      |
| 47       | Wesche Electric Co., B. A.        | 47       |
| 323      | Wesson Co.                        | 323      |
| 223      | Westcott Chuck Co., Inc.          | 223      |
| 327      | Western Tool & Mfg. Co.           | 327      |
| 387      | Wetmore Reamer Co.                | 387      |
| 385      | Wheel Trueing Tool Co.            | 385      |
| 326      | Whitney Chain & Manufacturing Co. | 326      |
| 328      | Whitney Metal Tool Co.            | 328      |
| 147      | Whitney Screw Corp.               | 147      |
| 89       | Wiedemann Machine Co.             | 89       |
| 110      | Wigglesworth Machine Tool Co.     | 110      |
| 144      | Willey's Carbide Tool Co.         | 144      |
| 39       | Williams & Co., J. H.             | 39       |
| 105      | Wilson, K. R.                     | 105      |
| 28       | Winter Bros. Co.                  | 28       |
| 162      | Wirth & Son, Carl                 | 162      |
| 84       | Wood & Spencer Co.                | 84       |
| 189      | Wright Manufacturing Div.,        | 189      |
|          | American Chain & Cable Co., Inc.  |          |
| 264      | Yohe Supply Co., Wm. S.           | 264      |
| 323      | Ziegler Tool Co., W. M.           | 323      |

# YOU'D HOWL TOO....

## WITH GRIT IN YOUR TEETH



Abrasive grit and dust, spewed from the wheels of unguarded grinders and buffers, can turn the purr of finely honed gears on your expensive shop machinery into a discordant howl that the best lubricants won't silence.

Sure, we know that nobody expects a tool room to sound like a symphony concert, but when gears begin to clatter and bearing surfaces lose their smoothness, production takes a nose-dive.

End the assault of grit and dust on precision manufacture by installing the Cincinnati Air Master on your grinders and buffers, trapping trouble at its source. The Air Master comes in three sizes to fit all grinding and buffing machines. Write for complete information.



# *The Cincinnati*

**ELECTRIC DRILLS • GRINDERS • BUFFERS • PORTABLE TOOLS**  
**The Cincinnati Electrical Tool Co.**

DIVISION OF THE R. K. LI BLOND MACHINE TOOL CO., CINCINNATI, OHIO

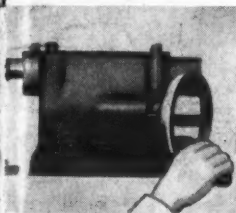
**3809-S**

**MADISON RD.**

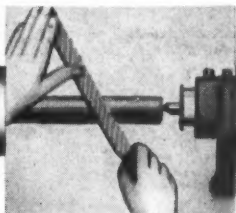
# I'm Tellin' You.

No. 12 in a series on "Keeping 'em Turning"  
by Charles Carr, 37 years at LeBlond

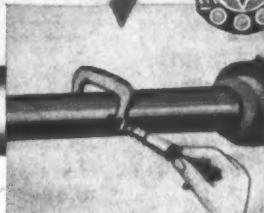
"We old-timers have been passing along the tips on 'Keeping 'em Turning' and we've given you about every important point in the book. But no matter how good a job of turning you've done, it's pretty tough to get a finish smooth enough to be used directly in service. You won't always have a grinding machine available and that's where filing and polishing come in. This is the way an old-timer does it . . ."



With work set up on headstock center, run tail center up tight, then back off slightly and start lathe to run at twice finish turning speed, adjusting center to allow dog to click in face plate but not to allow rattle or end shake.



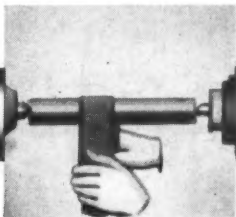
Use a 12-inch mill file with slow, even strokes, lapping from side to side. Use a long, slow forward stroke and press firmly and evenly on the revolving piece being filed. Relieve pressure on return stroke.



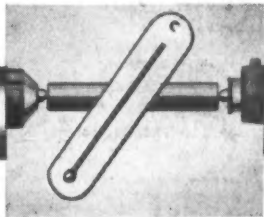
Stop lathe and try diameter with micrometer frequently until whole surface is filed as straight and smooth as possible. Leave from five to eight ten-thousandths (.0005 to .0008) of an inch for polishing the work.



or polishing work that is well-balanced, set change levers to give the highest possible speed. On unbalanced work, run the lathe at highest speed possible without vibration. A speed lathe is best for straight shafts one inch or less in diameter.



Use strip of emery or carborundum paper of fine grade and press against work, moving abrasive cloth from side to side to cross lines and bring work to rough polish without cutting rings. Use very fine abrasive cloth and oil on work for final polish.



Watch out for heat! Remember, polishing and filing heat the work. When measuring with a micrometer, either cool the work by immersing in water or else make an allowance of one or two ten-thousandths of an inch for cooling of work.

LS

RD.

194



THE L. B. LEBLOND MACHINE TOOL CO.  
CINCINNATI, OHIO

Largest Manufacturer of a Complete Line of Lathes

*Completely  
Cold Forged*



*Save*

**WEIGHT-SPACE-TIME**

BY USING THIS BETTER FASTENER METHOD

*The Holo-Krom Fastener*

**HOLO-KROM**  
*fibro forged* **SOCKET SCREWS**

THE HOLO-KROM SCREW CORP. HARTFORD, CONN.

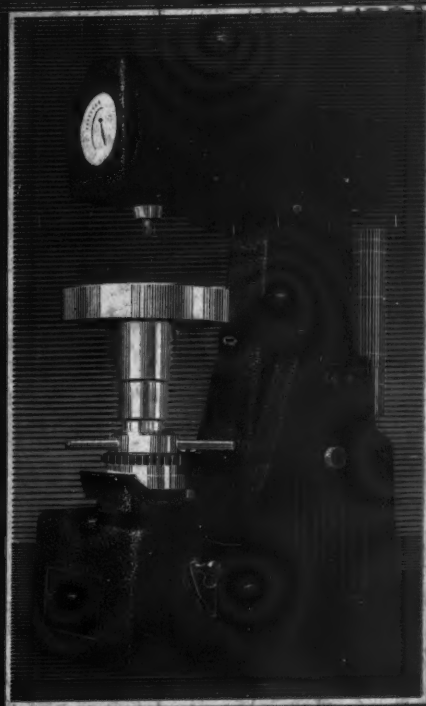
MODERN

September, 1943

# Machine Shop

**ROCKWELL** IS OUR TRADE MARK  
FOR HARDNESS TESTERS

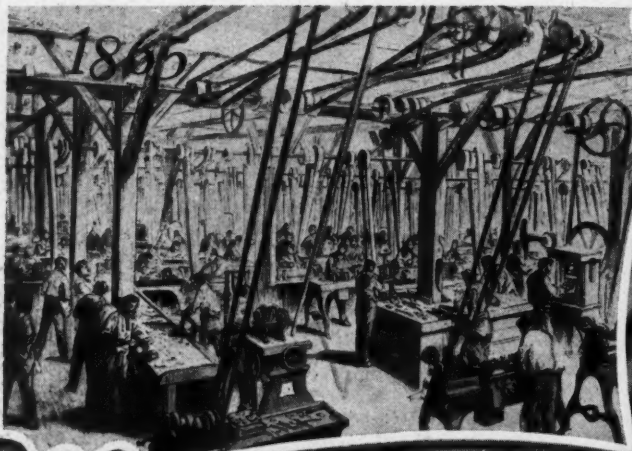
**THEY HAVE EVERYTHING—  
PRECISION · SPEED · ADAPTABILITY**



**WILSON**

CONCORD AVE. NEW YORK MECHANICAL INSTRUMENT CO. INC.

# Just imagine / production then



Bettmann Archive

THIS interior factory view is taken from a woodcut of the period around 1865. Suppose this war had to be fought and won with yesterday's production equipment. In those days the line shafts, transmissions and belts fixed the layout of the machines, causing the loss of valuable floor space and adding to the general confusion. Tooling was a slow, tedious process. Work was fed and chucked by hand. Compared by the standards of today, production was negligible. And what was the greatest single improvement over the old methods? Perhaps it

was the advancement in the use of air and hydraulics. The applying of air or hydraulic pressure for the operation of chucks, work holding and ejecting devices, stamping and assembling presses and many other labor saving devices. "LOGAN" Air and Hydraulic Equipment has solved production problems and speeded up manufacturing in most of America's largest industrial plants. Let "LOGAN" Engineers make recommendations on modernizing the equipment in your plant by the application of Air and Hydraulic equipment.

## LOGANSPOUT MACHINE, INCORPORATED

901 FAYSON ROAD LOGANSPOUT, INDIANA

Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

# THE SUPREME TEST PROVES TIMKEN BEARINGS

"Tops"

After  
Victory—competi-  
tion at its keenest.  
Prepare now to meet it;  
redesign your machines  
to use more Timken  
Bearings.

The requirements of war production have put machine tools to the supreme test for performance, dependability and endurance.

In the face of merciless demands for speed—and still more speed; exacting work tolerances; and sustained operation, heavy duty machines equipped with Timken Bearings—are increasing output all along the line.

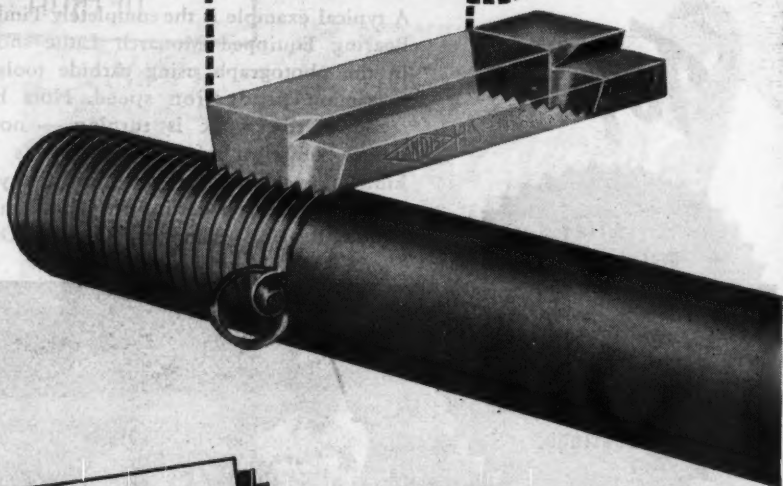
A typical example is the completely Timken Bearing Equipped Monarch Lathe shown in the photograph using carbide tools at maximum production speed. Note how steadily the work is turning—not a quiver or sign of chatter. That's the kind of performance you need in your machines; are you getting it? The Timken Roller Bearing Company, Canton, Ohio.

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DETROIT



TIMKEN  
TRADE MARK REG. U. S. PAT. OFF.  
TIMKEN ROLLER BEARINGS

# WITH THE LANDIS CHASER APPROXIMATELY 80% OF THE CHASER'S LENGTH IS *USABLE*



## 12 Features of the LANDIS TANGENTIAL CHASER

- 1-Permanent throat permits close to shoulder threading throughout life of chasers
- 2-Flank angle range covers all machineable materials
- 3-Free cutting condition permits maximum cutting speeds
- 4-Simple grinding operation renews entire cutting edge and leading feature
- 5-Line contact with work lessens friction and minimizes thread distortion
- 6-Leading feature insures thread of accurate lead
- 7-Lateral absorption of cutting strain reduces vibration and chaser breakage
- 8-Night and left-hand threading feature reduces chaser equipment
- 9-Standard chasers thread all diameters with proper chaser holders
- 10-Interchangeability of chasers lowers operating cost
- 11-Chaser length provides exceptionally long life and low tool cost
- 12-Permanent throat gives equal distribution of cut

## CHASER LENGTH PROVIDES EXCEPTIONALLY LONG LIFE AND LOW TOOL COST

Since the design of the Landis Chaser makes it possible to reground approximately 80% of its length, with the cutting edge renewed at each regrounding, it has an exceptionally long life and thereby reduces chaser cost to a minimum. Conservatively estimated, the life of the Landis Chaser is from ten to twenty times that of the hobbed type die.

*The Finest Thread Cutting Tool in Industry*

# LANDIS

## MACHINE COMPANY

WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

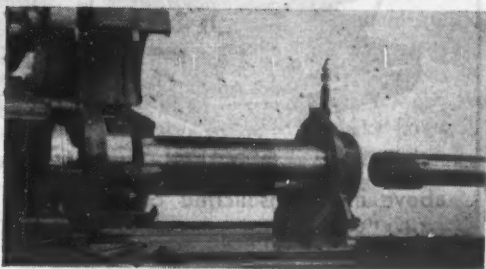


## PRECISION takes the bounce out of Rough Landings

Setting a giant war bird down without a bounce calls for a skillful job of piloting . . . calls for precision manufacture of all landing gear components, too.

By grinding many of the parts on Heald Automatic Grinders, aircraft manufacturers get extreme accuracy in every component. Accuracy that enables the landing gear to cushion the shock of the roughest landing.

However, this is but one of the many Heald precision grinding and boring applications. In the aircraft industry alone, you will find hundreds of Healds boring, grinding, turning, grooving, forming, milling, and facing airplane components to the closest tolerances at



Shown above is a Heald No. 74 Extended Bridge Internal grinding big aircraft strut cylinders. A bore 6" I.D. x 31 $\frac{1}{4}$ " long is ground in these struts. Strut is held at one end by a four-jaw chuck attached to the workhead and at the other end by a steadyrest, both workhead and steadyrest being mounted on the extended bridge.

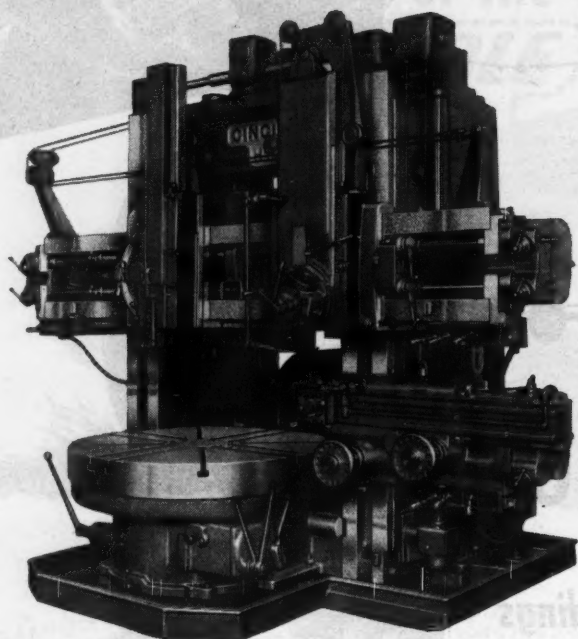
mass production speeds.

Heald Engineers will gladly help you with your precision grinding and boring jobs. Ask for their services, today.

THE HEALD MACHINE CO., Worcester, Mass., U.S.A.

**For More Precision Faster, bring your problems to Heald**

**"CINCINNATI BORING MILLS AND PLANERS  
ARE THE BACKBONE OF OUR OUTPUT!" . . .**



**54" Mill  
Illustrated  
includes all  
the unexcelled  
Hypro features  
including**

**Rigidity  
Accuracy  
Speed  
Low Cost**

One of America's largest manufacturers of gun-mounts told us the above in an unsolicited compliment to Hypro-duction machines. He said: "We all appreciate your complete cooperation in our struggle to equip this plant."

— And now you can enjoy even faster cooperation than we gave this gun-mount manufacturer. We can now offer Cincinnati Hypro Vertical Boring Mills of all sizes on very attractive deliveries.

**The CINCINNATI PLANER Co.**

CINCINNATI

OHIO, U. S. A.

PLANERS • PLANER MILLERS • VERTICAL BORING MILLS



**F**ARREL-SYKES herringbone gears are made in a complete range of sizes, from  $\frac{1}{4}$  inch to 20 feet diameter,  $\frac{1}{4}$  to 60 inch face, 24 DP to 0.75 DP, and for any power capacity. Known as *The Gear with a Backbone*, Farrel-Sykes gears have continuous teeth with sharp apices, which give them extra strength and high load-carrying capacity in small space. Combined characteristics of overlap or interlacing of the teeth, gradual engagement and inclined line of pressure contribute to smooth, quiet operation and maintenance of correct tooth action throughout the life of the gears.

Straight tooth (spur) gears and single helical gears are supplied in any size from  $\frac{1}{4}$  inch to 20 feet diameter,  $\frac{1}{4}$  to 30 inch face, 24 DP to 0.5 DP. We are also equipped to make large, internal gears, with either spur or helical teeth, in sizes up to 18 feet diameter, 12 inch face,  $1\frac{1}{4}$  DP.

Our engineers will be glad to assist you in working out unusual gear problems. Many years of experience qualify them as experts in the correct application of all types of gears.

Literature and information on request.



**FARREL-BIRMINGHAM COMPANY, INC.**

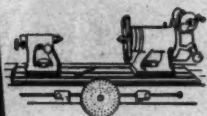
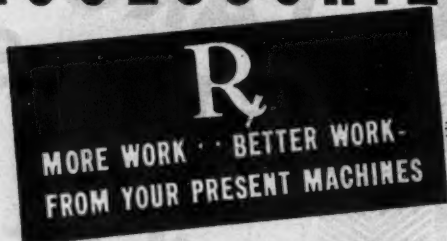
ANSONIA, CONN.

BUFFALO, N. Y.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y. -- Branch Offices: New York, Pittsburgh, Akron, Los Angeles



# ABRASIVE ACCESSORIES



Originally designed to increase and improve the work of Abrasive Surface Grinding Machines, the Accessories and Attachments listed below are serving efficiently not only on Abrasive Machines, but on many other machines of various types. Made to the same high standards as all Abrasive Products, they are saving time and boosting production in many machine shops.

**EXHAUST ATTACHMENT**

**WET GRINDING ATTACHMENT**

**WISE, PLAIN**

**WISE, SWIVEL**

**RADIUS TRUING DEVICE**

**RADIUS & ANGULAR  
TRUING DEVICE**

**8" INDEX CENTERS**

**SEMI-AUTOMATIC INDEX CENTERS**

**WHEEL COLLETS FOR ABRASIVES**

**12" & 18" RING**

**WHEEL CHUCKS**

**CORTLAND SEGMENTAL  
WHEEL CHUCKS**

**DEMAGNETIZERS**

**D. C. GENERATOR (Belt Drive)**

**MOTOR GENERATOR SET**

**MAGNETIC CHUCKS**

**HIGH SPEED ATTACHMENT**

*(Liberty Tool & Gage)*

**ROTARY GRINDING ATTACHMENT**

**12" for Abrasive #34**

**6" and 8" for Abrasive #3B and #1½**

*Write for further information and prices on specific equipment*

**HELP YOUR OPERATORS  REDUCE SET-UP TIME  AND INCREASE PRODUCTION **



**ABRASIVE MACHINE TOOL CO.**

*Dealers in Principal Cities*

**EAST PROVIDENCE · RHODE ISLAND**

# FOR BAR OR INDIVIDUALLY CHUCKED WORK REQUIRING UP TO EIGHT SUCCESSIVE OPERATIONS

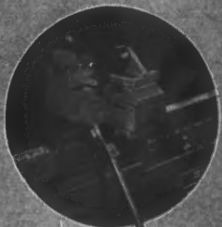
The Rivett No. 918 Hand Screw Machine incorporates precision balanced design and operating features to make it an efficient producer on small duplicate parts. Work requiring up to eight successive operations can be finish-machined at one chucking. For straight turning, the work spindle may be held in push-out collets, or the work may be held in draw-in collets for taper turning. In combination with the turret slide, the work spindle may be set for straight or taper turning, forming or cutting-off. Other combinations include using chasing bar for internal or external threading, or compound slide rest with turret tool post. Steel cabinet mounting has rimmed top and pump for cutting oil. Bench mounting is optional.



Straight and Taper Turning  
Slides



Straight Turning Slide and  
Fixed Block

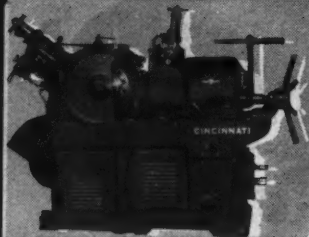


Cutting-Off and Forming  
Blocks

## SPECIFICATIONS

|  |                    |
|--|--------------------|
| Swing over bed, dia.   | 18"                |
| Distance between spindle mouth<br>and face of turret             | 18"                |
| With draw-in collet  | 14 1/2"            |
| With push-out collet   | 13 1/2"            |
| Collet capacity:   |                    |
| Draw-in type, max. dia.  | 1 1/2"             |
| Push-out type, max. dia.   | 1 1/8"             |
| Step chuck capacity, max. dia.                                   | 1 1/8"             |
| Low chuck capacity, max. dia.                                    | 1 1/8"             |
| Spindle capacity, max. dia.                                      | 1 1/8"             |
| Travel of turret slide, max.                                     | 4 1/2"             |
| Number of tool holes in turret                                   | 6                  |
| Dia. and depth of tool holes                                     | 3/8" x 1"          |
| Swing over double tool slide                                     | 4 1/2"             |
| Cross travel of double tool slide                                | 1 1/2"             |
| Travel of straight turning slide                                 | 2 1/2"             |
| Travel of taper turning slide                                    | 2 1/4"             |
| Spindle speeds, eight forward and<br>reverse:                    |                    |
| Low range  | 150 to 2500 r.p.m. |
| High range   | 225 to 3750 r.p.m. |
| Weight of hand screw machine<br>mounting and drive, net 900 lbs. |                    |

**RIVETT LATHE & GRINDER INC.**  
BRIGHTON, BOSTON, MASS.



**CINCINNATI No. 2**  
Centerless Grinding Machine. Complete engineering data may be obtained by writing for catalog No. G-496-1.

FOR SALE OR LEASE  
WORK REQUIRING UP TO 10 HOURS  
SUCCESSIVE OPERATIONS

2% AT

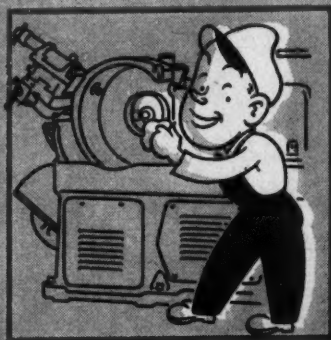
PAYS 98% PRODUCTION

•Time out from actual production for routine service attention may seem like an unwarranted interruption, but it's just as essential as the operator's personal fitness program. The urgency rating of production must never crowd out the still small voice of attention . . . attention to details of service that keeps the machine running . . . attention that keeps the machine producing during 98% or more of the normal working hours.

The CINCINNATI No. 2 Centerless Grinding Machine, for example, is a "bear" for work, but it, too, re-



Balance new grinding wheels; and worn ones, too, for the wheel may lose its balance as its diameter wears down. A good time to rebalance is when the wheel mount has been removed for cleaning the slinger grooves.



Remove wheel mounts once a week, wipe the slinger grooves clean, and clean out the drain hole. (Both regulating and grinding wheels.) This will prevent water and grit from contaminating the spindle oil.

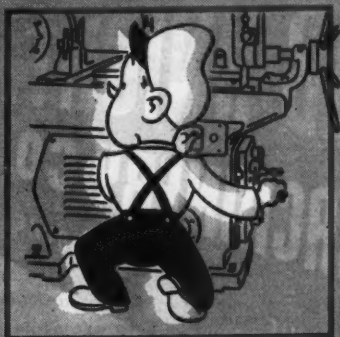
THE CINCINNATI MILLING MACHINE CO.

TOOL ROOM AND MANUFACTURING MILLING MACHINES SURFACE BROACHING MACHINES CUTTER SHARPENING MACHINES

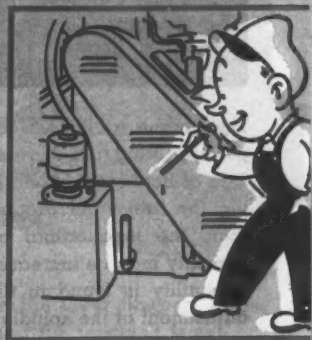
# 2% ATTENTION DUCTION DIVIDENDS

quires routine service attention to keep going. Some of the more important items are illustrated at the left. If you will consider the time required for these chores, you will find that it takes no more than about 57 minutes of a 56 hour week. In other words, two percent of the operator's time spent in routine service attention keeps the machine producing the remaining 98% of his time.

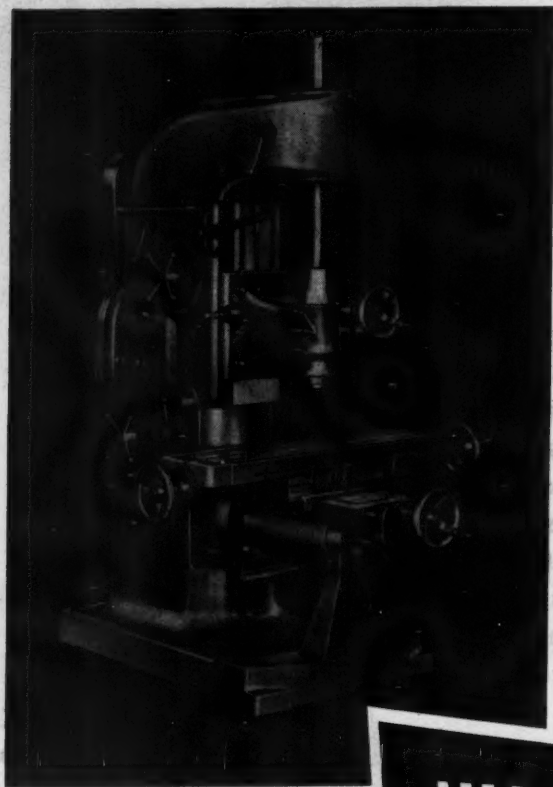
Why not give your Centerless a break. Don't begrudge it that 2% service attention, and you'll find that its always on the job ready to produce.



Stop machine before changing regulating wheel speeds. This will save wear and tear on the gears and chain.

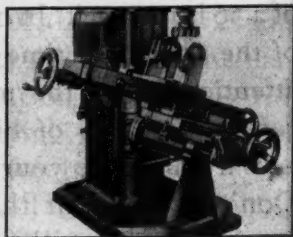


Lubricate machine and check oil levels daily. Use lubricants specified in service literature and on machine instruction tags. Slides on machines for high production *infeed* work should be wiped clean, moved full length, and lubricated twice each shift.



# NO Special EQUIPMENT

The Knight Miller Can  
Quickly and Accurately  
Machine Difficult and  
Unusual Parts.



Besides swivelling around  
the column, the table  
may be tilted to either  
side of horizontal.

The unique table unit construction permits tilting it 35 degrees to either side of horizontal. Then by swiveling the table unit around the column, the longitudinal and throat capacity may be increased. Further versatility is found in the vertical adjustment of the spindle head and spindle, both of which are counter-balanced for easy handling. These features, used individually or simultaneously, effect many savings and broaden the scope of the miller.

**WRITE FOR CATALOG.**

## W.B. KNIGHT MACHINERY CO.

ST. LOUIS

MISSOURI



September, 1943

CUTTE

It is a  
most ca  
up and  
simple,  
well as

H E

1 River St. S

# Irregular Shapes are Routine Jobs on the Gear Shaper

CUTTER

CUTTER

WORK

WORK

CUTTER

WORK

7A-Type  
High-Speed  
Gear Shaper

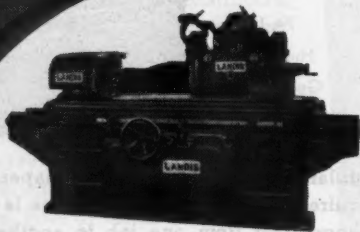
It is a simple and easy job to generate irregular contours on the Gear Shaper. In most cases it only requires a cutter of the required contour, and the machine is set-up and operated in the usual manner. Change over from one job to another is simple, quick and easy. That is why the Gear Shaper belongs in the jobbing as well as in the production shop. Write for "The Practical Art of Generating."

**THE FELLOWS GEAR SHAPER  
COMPANY**

River St., Springfield, Vermont — 640 West Town Office Building, Chicago, Illinois — 616 Fisher Building, Detroit, Mich.

# IT'S ALL HERE

Grinding machine operators are beset by many temptations. One of these is feeding the wheel too fast. Seems like the thing to do in order to complete a job quickly. All too often both production and finish suffer in the end. The operator who wishes to familiarize himself with proper wheel feed procedure may do so by sending for the book "Better Grinding." Just mail the coupon at the bottom of the opposite page. Along will come almost 100 pages of the most practical grinder operating information you ever saw.



IF YOU HAVE A GRINDING PROBLEM

*Let George do it*

## LANDIS TOOL COMPANY

### Chapter XI

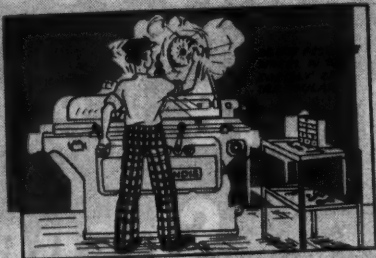
## GRINDING WHEEL FEED

Too rapid feeding of the grinding wheel is a common mistake, particularly when the operator is attempting to produce a fine finish. In the long run, time is saved by feeding the grinding wheel slowly and rapidly and thereby building up a good finish from the start of the grind.

One of the most discouraging temptations that an operator can have is to feed the work diameter varying from piece to piece for no apparent reason. Obviously this will be found due to too much feedstock in the wheel feed mechanism.

Good grinding machines are provided with a machine for setting up the wheel backlink and this should always be checked into when there is an unusual measurable variation in the accuracy of machine output.

Study each job carefully and work out the best method of grinding wheel feed for it. This will be far superior from the point of view of results than using the same method for all classes of work regardless of their individual characteristics. And finally, be sure to utilize the automatic wheel feed whenever possible.



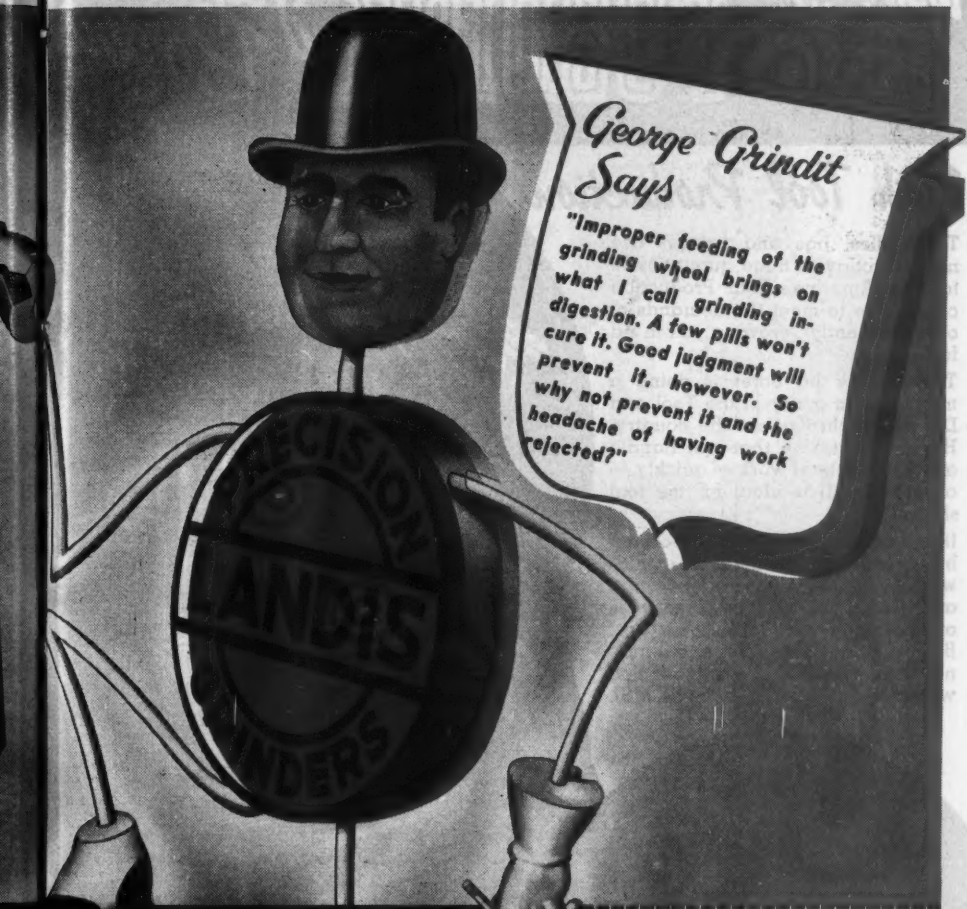
Rapid or irregular feeding will cause the wheel to wear down quickly and wear unevenly, which in turn makes it impossible to secure either accurate work or good finish.

### THE LANDIS 14" - 18" TYPE C HYDRAULIC UNIVERSAL GRINDERS

- Recommended for miscellaneous small lot production grinding, for certain classes of tool room work and for machine maintenance.
- Used by a vast number of war industries where the requirement is for a sturdy machine suitable for between center, internal and face grinding operations.
- Available in 14" and 18" swings and 36", 48" and 72" lengths.

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## THE CHAPTERS

Work Centers and Centers in the Work . .  
 Work Drivers and Driving Dogs . . Work Rests  
 . . The Diamond . . Wheel Dressing and Wheel  
 Truing . . Mounting and Balancing the Wheel  
 . . Grinding Wheel Coolant . . Lubrication . .  
 Multiple V Belt Drives . . Wheel Spindles and  
 Bearings . . Grinding Wheel Feed . . Grinding  
 Wheel Width . . Speed of Work Carriage Tra-  
 versal . . Work Speed . . Grinding Wheel  
 Speed . . The Grinding Wheel . . Chatter . .  
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**"BETTER GRINDING"**

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COMPANY

ADDRESS

CITY  STATE  II

Please Print Above and Send To  
**LANDIS TOOL CO.**  
 WAYNESBORO, PENNSYLVANIA

# WAYNESBORO, PENNSYLVANIA

*With the  
Emphasis  
on SPEED*

# FOSDICK Jig Borer

## Rush Tool Production

Tools, dies, jigs and fixtures are needed today in huge quantities to tool up America's War Production on a scale to meet the demands of our constantly growing armed forces.

The Fosdick Jig Borer is doing a major job in many of the Tool and Die Shops throughout the country. Here's a machine that can handle a wide variety of work — quickly — accurately. It is ideal for the tool shop.

Illustrated is one of them working in a Tool and Die Shop in a mid-western city. The ease of operation and simplicity of control enables ordinary operator to become proficient in a short time and eliminates necessity for highly skilled workmen. Write for Bulletin MSJ.



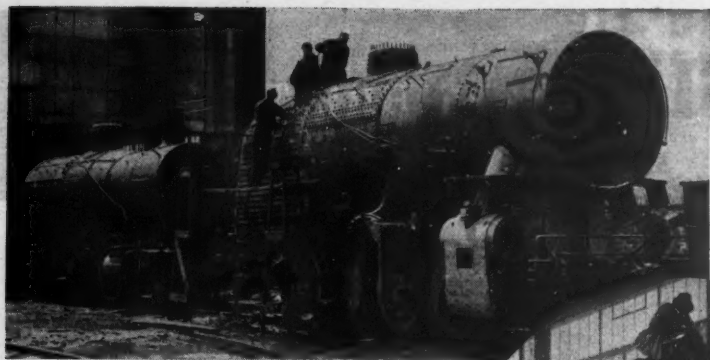
# FOSDICK MACHINE TOOL COMPANY

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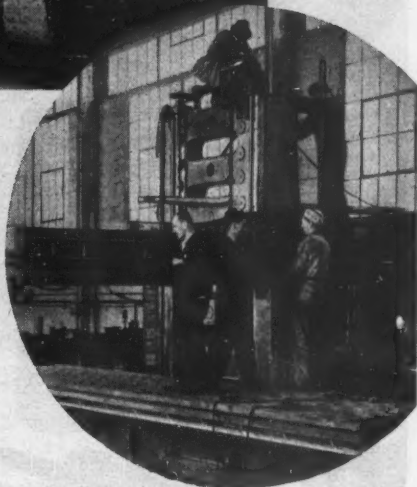
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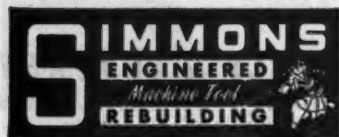
# CAN IT RUN?

**then get it  
running!**



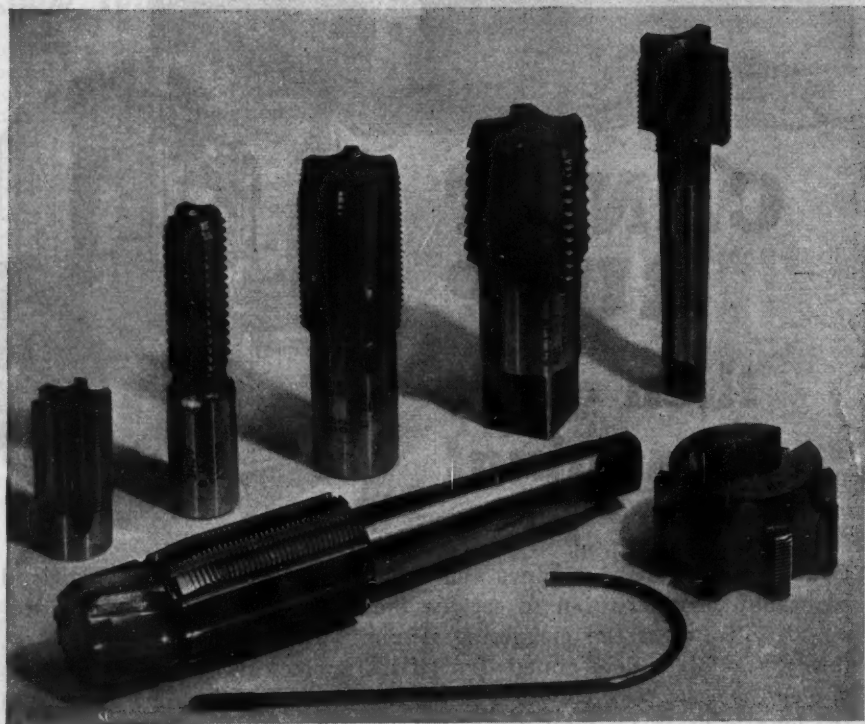
Fifty-eight discarded engines that could! The New Haven Railroad has rebuilt and restored to service that many graveyard-bound locomotives. To meet the staggering demands of wartime transportation, the railroads are determined that "if it's got wheels, get it rolling!" As you can see, the New Haven is doing just that, reconditioning them from the wheels up. ★ Of vital machine tools, the Simmons slogan is, "If it can run, get it running—and keep it running!" Here at the country's largest rebuilding plant machine tools of all categories and sizes are restored to active service—from large open-side planers (see photograph) and 110" gun lathes to toolroom millers and screw machines. Railroad shops, shipyards and automotive plants, among others, are using machine

tools rebuilt and modernized by Simmons engineers. If you have a metal-working problem, let Simmons take it over. Simmons Machine Tool Corporation, 1745 North Broadway, Albany 1, N. Y.



# BESLY

## TAPS ARE TOPS



Besly Taps are good Taps. Every step of our manufacturing process is closely watched to the end that taps bearing the name "Besly" do perform as they should. When you think of tapping remember Besly Taps are "tops".

**Send for CATALOG No. 67**

*It has a wealth of useful information for Tap users*

**CHARLES H. BESLY & COMPANY**  
 118-124 NORTH CLINTON ST., CHICAGO, ILLINOIS  
 FACTORY: BELOIT, WISCONSIN

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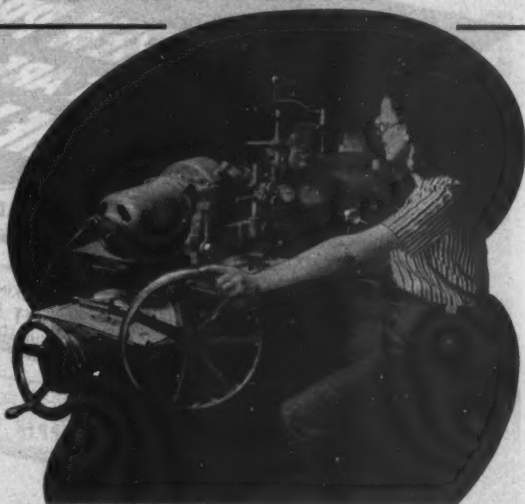
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# THE MILWAUKEE FACE MILL GRINDER GIVES YOU ALL THREE!

1. UNUSUAL RIGIDITY
2. REDUCED  
SHARPENING TIME
3. ACCURACY  
TO WITHIN  
.0002 PER INCH



**T**HE basic design of the Milwaukee Face Mill Grinder embodies strength, precision, and capacity. It is capable of sharpening Tungsten Carbide Cutters ranging from 3" to 16" in diameter—grinds the blades to within .0002 per inch. Set-ups are quickly made with graduated dials, facilitating adjustments. Other controls are handily located for simplified operation.

## OTHER IMPORTANT FEATURES:

1. Jeweled bearing dial indicator for accurate checking.
2. Finger tip control.
3. Fine thread precision saddle screw.
4. Hand screw permits angular setting of 15° on either side.
5. No adapters necessary.
6. Spindle has No. 50 National Standard Taper.
7. Blower system at slight extra cost.

## Reject the Source of the Error...not the Finished Product...USE CENTER SCOPE!

The Center Scope is an optical locating machine shop tool, constructed for use on any machine from jig borers to bench drills. No technical knowledge or training is needed to use it. It is a necessary production tool—necessary today because you are interested in saving time—tomorrow, because you will be interested in saving cost. Built in various models; variable and rotating Center Scope priced at \$97.00, with taper shank, \$125.00; Special Center Scope, \$125.00—Edge Block, \$23.00 additional.

Write Department CS, for complete information.



## Kearney & Trecker Products

CORPORATION

Milwaukee, Wisconsin

Subsidiary of Kearney & Trecker Corporation

Rotary Head  
Milling Machine

Autometric  
Jig Borer

Center Scope

Milwaukee  
Face Mill Grinder

Milwaukee  
Midgetmill

Milwaukee  
Speedmill

# 4 SCREW PRODUCTS THAT ARE HELPING WIN THE WAR



REG. U. S. PATENT OFFICE

## UNBRAKO

Pat'd.  
and For. Paid.

Over 40 Years in Business

### STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA., BOX 588 • BRANCHES: BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO

The Knurled "Unbrako" Socket Head Cap Screws are Production Time Savers because their knurled heads positively prevent time wasting finger-slip so each turn counts.

The "Unbrako" Self-Locking Hollow Set Screw is a maintenance time saver. When tightened as usual the knurled point digs-in and defies vibration. Where the ordinary set screw might work loose the "Unbrako" Self-Locker is sure to hold tight, and your equipment is therefore safe from the effects of vibration. Can be easily removed and used again and again.

The "Unbrako" Socket Head Stripper Bolt. Also has the time-saving knurled head.

The "Unbrako" Square Head Set Screw. Strong. Accurate. Can be had with or without the self-locking knurled point that holds it securely in place when tightened.

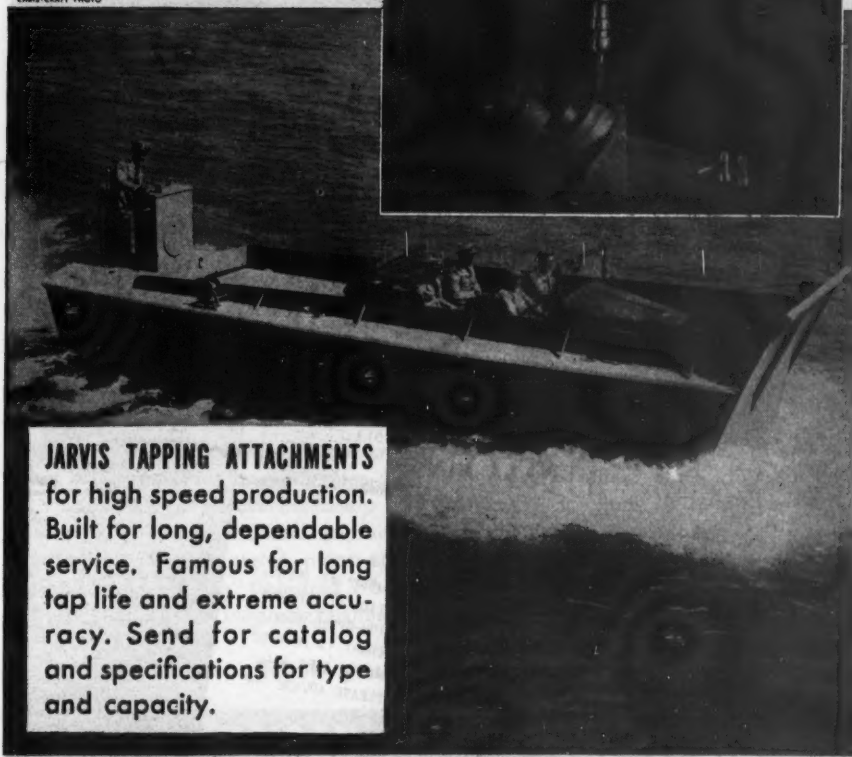
For complete details get the "Unbrako" Catalog.

Sizes: No. 4 to 1 1/4" diameter

Knurling of Socket Screws originated with "Unbrako" years ago.

# Jarvis POWER TOOLS

CWBS-CRAFT PHOTO



**JARVIS TAPPING ATTACHMENTS**  
for high speed production.  
Built for long, dependable  
service. Famous for long  
tap life and extreme accu-  
racy. Send for catalog  
and specifications for type  
and capacity.

**THE CHARLES L. JARVIS CO., MIDDLETOWN, CONN.**

TAPPING ATTACHMENTS • FLEXIBLE SHAFT MACHINES • GROUND ROTARY FILES

# JUST OUT!

**SURFACE SPEED TABLE AND TOOL SELECTOR**

YELLOW SHADING AREA INDICATES CRUISING CUTTING RANGE

BLACK SHADING AREA INDICATES SEVERELY OVERLOADING CUTTING RANGE

FEED SPR MINUTE

NEW TUNING AND INDICATOR  
GENERAL HIGH SPEED SEE  
CUTTING RANGE

WILLIAM SHAW AND  
JOHN G. GIBSON

BLUE SHIMED AREA INDICATES  
GENERAL CLIMATE FORM

TABLE OF SURFACE SPEEDS PER MINUTE

[illegible]

**WESTERN UNION**

**CU126 74/73**

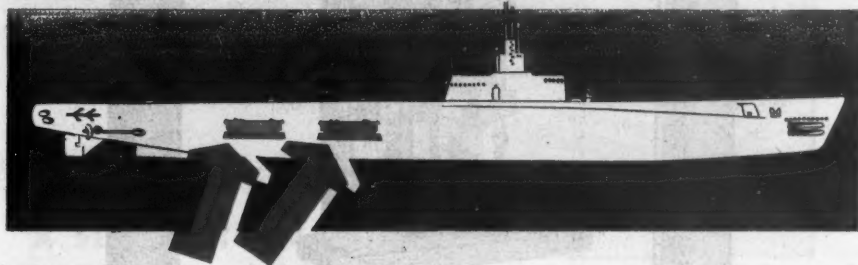
PRODUCTION MANAGER-  
ANY DEFENSE PLANT

NEW TABLE OF SPEEDS, FEEDS AND TOOL SELECTOR JUST OFF PRESS.  
PRINTED IN FOUR COLORS TO GIVE INSTANT SELECTION OF CORRECT  
CUTTING TOOL. ONE GLANCE SHOWS WHEN TO USE HIGH-SPEED STEEL,  
TANTUNG OR CARBIDES TO THE BEST ADVANTAGE. CHART IS PRINTED  
ON HEAVY STOCK, PUNCHED AND READY TO HANG. ONE OR MORE WILL  
BE SENT TO YOU WITHOUT COST OR OBLIGATION. PLEASE ADVISE THE  
NUMBER OF CHARTS YOU WILL NEED FOR YOUR PLANT=  
VASCOLLOY-RAMET CORPORATION.

**VASCOLOY-RAMET** CORPORATION • NORTH CHICAGO, ILLINOIS

# "American"

## GRINDING WHEELS



### *Where Precision is Vital*



America's "pig boats" hit the enemy where it hurts. Day and night they stalk their prey in the trackless ocean wastes, driven by engines whose perfect functioning is a tribute to Yankee craftsmanship and production methods. We are proud that many parts of these Diesel engines...cylinder liners, needle valves, hardened steel spacers, motor plates, pump shafts, plungers, bushings, etc. ...are precision-ground by "American" Grinding Wheels. Again, on this work, "American" Grinding Wheels confirm their long-established reputation for high quality and grinding ability.

**Let us know your grinding requirements.**

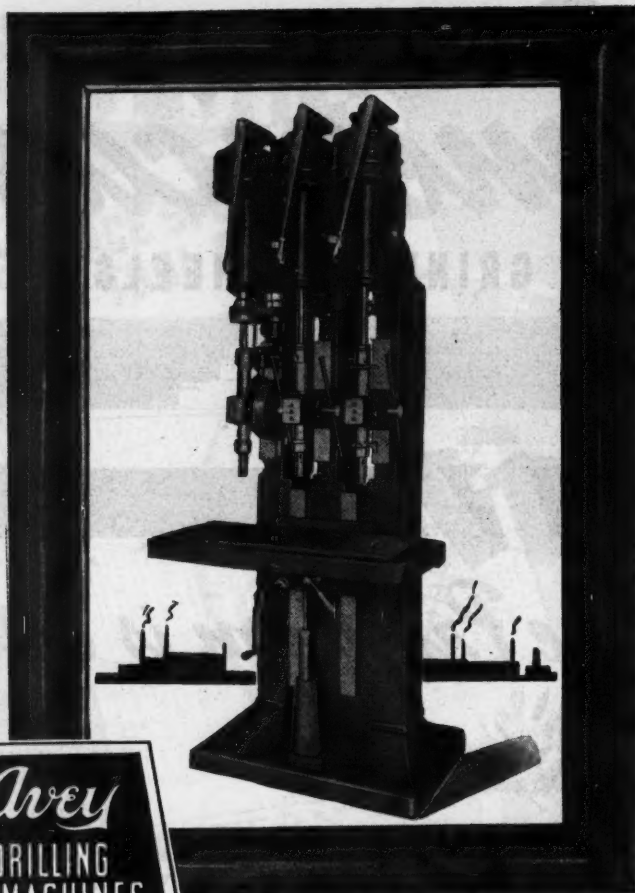


### **AMERICAN EMERY WHEEL WORKS**

ESTABLISHED 1898

PROVIDENCE

RHODE ISLAND



*Avey*  
DRILLING  
MACHINES

## ... IN THE PICTURE FOR 1943

Make sure it is in your production line for 1943. Avey Drilling Machines give longer operating hours, smoother performance and lower maintenance. They'll do your war job now, your peace job later. We illustrate the Avey Type MA-6 in No. 2 size (Capacity in cast iron,  $\frac{7}{8}$ " ). No. 3 size (Capacity in cast iron,  $1\frac{1}{4}$ " ). One to six spindle units, either size. Six speed machine, two speed motor, three mechanical changes through gearing, 8 to 1 speed range. Push button control. MA-6 illustrated, has three spindles, the Aveymatic Feed, Hand Feed and Tapper.



THE AVEY DRILLING MACHINE CO.  
Cincinnati, Ohio, U. S. A.

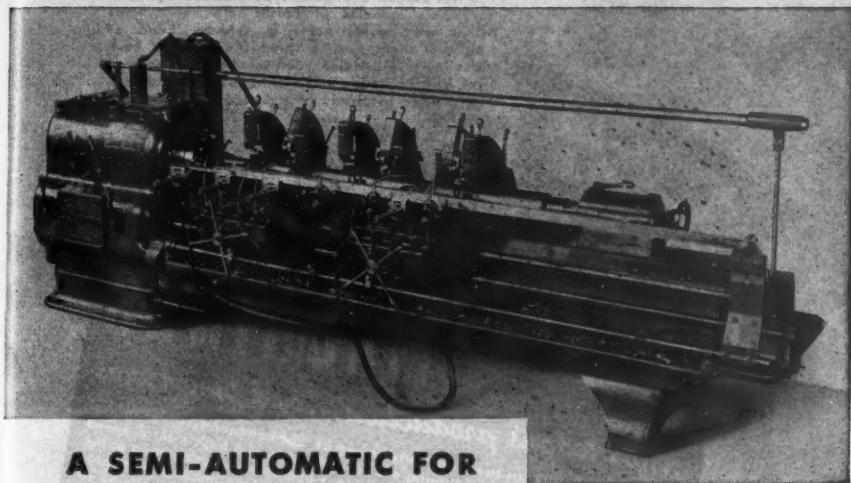
*Avey*

DRILLING  
MACHINES

# 8-INCH

# Lo-swing

# LATHE



## A SEMI-AUTOMATIC FOR LARGE OR SMALL LOT PRODUCTION

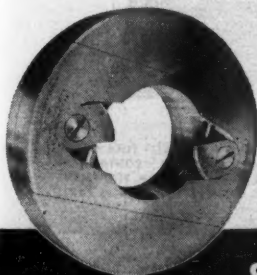
The Lo-swing Lathe principle differs basically from the conventional lathe in that multiple tools cut simultaneously. In Lo-swing design, the cutting points of the tools are always close to the carriage ways—eliminating all possibility of their springing away from the work. The Lo-swing Steady Rest, likewise, prevents the work from springing away from the tools. Lo-swing Lathes are made in two standard sizes: 4-inch and 8-inch. Their de-

sign makes them particularly suited for the rapid turning of shafts up to 8 inch diameter by 132 inch length, in the standard models. Routine operations include turning several diameters, both straight and taper, squaring shoulders, necking for grinding and making form cuts.

Adequate equipment for all ordinary work is available in standard accessories. For large lot production special tooling can be furnished to further increase production economies.

## SENECA FALLS *Automatic* WORK DRIVER

*Self Centering... Quick Acting... No Slip. Attaches to any chuck plate or spindle. Provides a positive, balanced drive which reduces chatter. Handles rough forgings or turned pieces — straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.*



### SENECA FALLS MACHINE CO.

SENECA FALLS  
NEW YORK



## EX-CELL-O CYLINDER BORING MACHINE

To left: Ex-Cell-O angular type machine equipped with six spindles to finish bore valve seats and valve guide holes in cylinder head of aircraft engine on a production basis. Each spindle is individually adjustable for depth of cut, as are the tools in the boring bars (boring bars, not shown in picture, are piloted in the fixture).

# SPECIAL MACHINES

*...for today's production... and tomorrow's*

## EX-CELL-O SIX-WAY MACHINE

Below: Ex-Cell-O six-way machine for drilling, broaching and reaming valve guide holes in a magnesium crankcase. This machine is equipped with four standard hydraulic power units and two Ex-Cell-O special hydraulic broaching units.

For years Ex-Cell-O has been familiarly known as "the headquarters" for special single-purpose machines for turning out accurate parts at a high rate of speed. . . . machines that frequently perform numerous operations in one setting of the work and often bring not only a substantial increase in the number of parts produced hourly but also improved quality and reduced unit cost. . . . This is why so many manufacturers have turned to Ex-Cell-O for equipment to meet their war production schedules; why Ex-Cell-O designed machines will figure in the post-war plans of an increasing number of American industries. . . . If you are planning for tomorrow, when the new standards will necessitate costs that are competitive, take advantage of the wide engineering experience and extensive manufacturing facilities that for many years have made Ex-Cell-O a leader in the precision machine tool field.

**EX-CELL-O CORPORATION • DETROIT, MICH.**



**XLO**

EX-CELL-O for PRECISION

*Precision* THREAD-GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JO-BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT • PURE-PAK CONTAINER MACHINES • R. & P. PINS AND BUSHINGS • PRECISION PARTS

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KEMPSMITH distributors are of big league calibre — the "ALL STARS" of the machine tool industry — trained and equipped to supply and service every type of tool, always dependable in the pinches. Phone your neighborhood Kempsmith distributor regarding your machining problems. He will gladly go "to bat" for you.

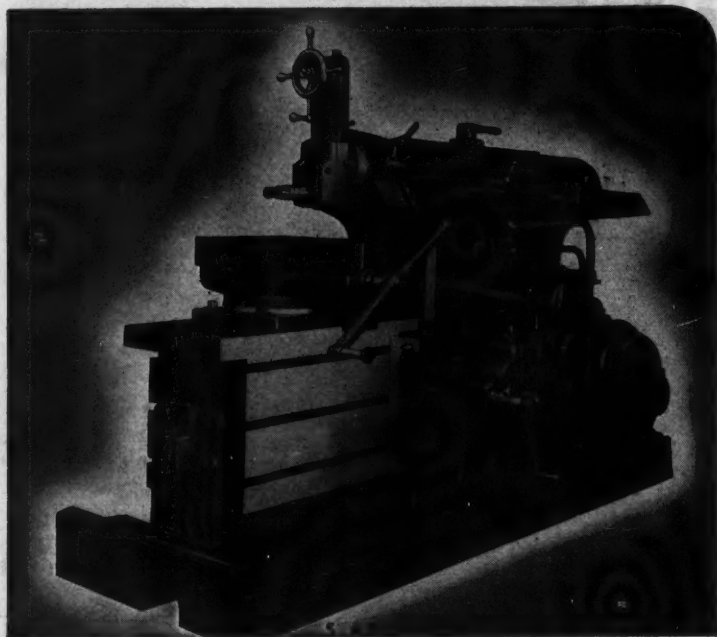
THE KEMPSMITH MACHINE CO.  
MILWAUKEE 24, WISCONSIN, U. S. A.

# KEMPSMITH

Precision Built Milling Machines Since 1888

**OHIO**  
STEP UP  
PRODUCTION

Orders for this machine are being shipped promptly.



Ohio Dreadnaught Shapers answer the insistent demand for top production with their ample power, heavy duty design and construction, and reserve capacity. These features enable them to machine bigger and still bigger parts and more and more of them.

One-position control makes the machine "easy on the man." Inbuilt

rigidity promotes fast, accurate work. Convenience and flexibility heighten production. Many accessories and attachments are available to meet your individual requirements.

Orders for Ohio Dreadnaught Shapers are now being filled with reasonable promptness. Better indicate your needs at once.

**THE OHIO MACHINE TOOL COMPANY, KENTON, OHIO**

**OHIO DREADNAUGHT**  
HORIZONTAL BORING, DRILLING AND MILLING MACHINES - SHAPERS - PLANERS

# SPEED UP "100-AND-1" SURFACING JOBS

with

## **SILVER STREAK**

### Metal Working CLOTH BELTS

**Silver Streak Abrasive Belts On Belt Grinders Eliminate "Traffic Jams" On Larger, Slower Millers and Shaping Machinery!**

Hundreds of busy shops save up to 50% on tool and parts grinding by utilizing small, speedy and accurate belt grinders equipped with SILVER STREAK Abrasive Belts. They turn out work faster and better . . . without "tying up" bigger, more important shop machinery. With fine grit Silver Streak, they are able to grind down to tolerances of .0005 with ease. Abrasive Products, Inc., 507 Pearl Street, South Braintree, Massachusetts.

## ABRASIVE

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JEWELOX • JEWEL EMERY • JEWEL GARNET



INC.

## PRODUCTS

MASSACHUSETTS

JEWELITE • JEWEL FLINT • NEW PROCESS



# Wherever Bearings Are Needed

Designers for both war and peace find here the facilities and the experience to meet any bearing specification however unusual.

● Bunting Bronze Standardized Bearings are available from stock in a wide range of sizes, completely machined and finished, ready for assembly. Write for catalog. Ask your wholesaler. The Bunting Brass and Bronze Company, Toledo, Ohio. Warehouses in Principal Cities.



# Bunting

## SINTERED CARBIDES

FOR PRODUCTION

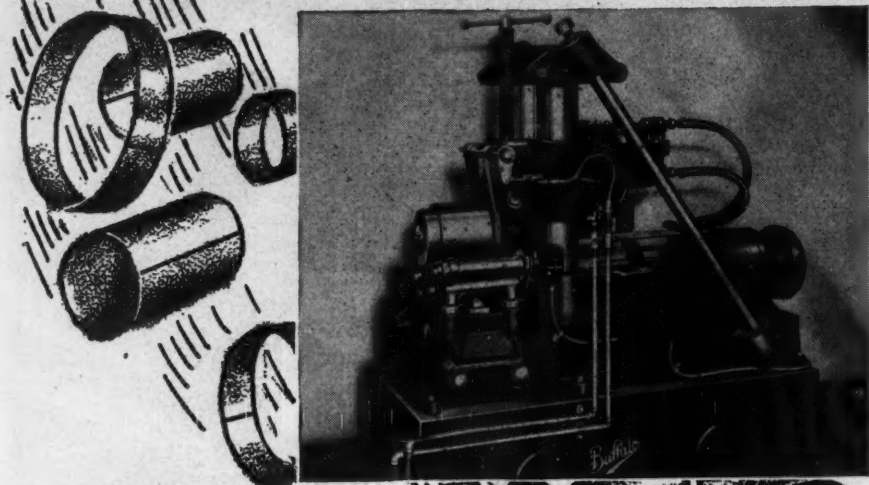
**Increases...280%...  
290%...300%...and  
over! New production  
records are chalked  
up day after day as  
the use of FIRTHITE  
Cutting Tools spreads  
through a shop—for  
turning, boring, fac-  
ing, milling, reaming.**

**FIRTHITE Sintered  
Carbides cut metals  
and non-metallic  
materials at higher  
speeds, faster feeds.  
FIRTHITE Engineers  
are at your service.**



**Steel Company**

# *Rolling 'em Out* **AT A RECORD PACE**



## **METAL RINGS • CYLINDERS GEAR RIMS • SHELLS • COUPLINGS**

The versatility of Buffalo Wrapping Rolls is today proving of inestimable value to scores of metal working departments under war pressure. Metal rings and cylinders ranging in thickness from 1/10" to 1 1/4" and a wide range of diameters can be turned out rapidly, accurately and continuously. Control is simple; master rolls for different diameters are easily changed, and adjustments quickly made. All but the heaviest work requires but a single pass through the rolls... Here's a practical short-cut for this special phase of metal fabrication. Details in Bulletin 3150.



**BUFFALO FORGE COMPANY**  
388 BROADWAY BUFFALO, N. Y.  
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

*Buffalo*

**WRAPPING ROLLS**

# PROSSER

## CARBIDE GRINDERS

● Modern, streamlined grinders for most rapid rough grinding and finest finishing of carbides, stellite, high speed steel, and other modern tools. Bench and floor type machines, of several capacities, for wet or dry grinding, as desired. Attachments for chip breaker and drill grinding.

### FEATURES OF PROSSER GRINDERS

- Quick-acting indexing tables.
- Adequate wet-grinding equipment.
- High grade ball bearing spindles.
- Oversize wheels, giving longer wheel life, and permitting grinding of larger tools.
- Moderate price.

**Prompt Deliveries  
Write for Details**

*Thomas Prosser & Son*

120 WALL STREET • NEW YORK

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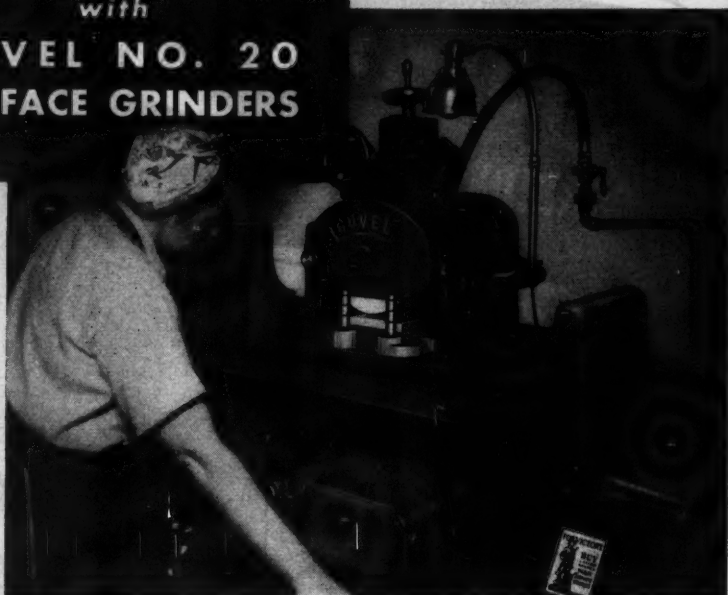
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## **SPEED DIE MAKING**

with

### **COVEL NO. 20 SURFACE GRINDERS**

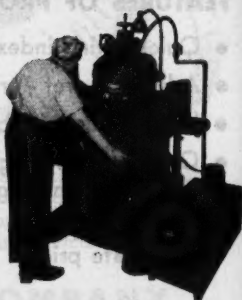
Shorten  
Employee  
Training  
Time With  
COVEL  
Equipment



Minutes saved in grinding add up to priceless hours saved in the vital job of die-making. Here a Covell No. 20 is finish-grinding a die surface at high speed. Note that it isn't necessary to remove leader pins. Thus time usually required to accurately replace and re-align pins can be devoted to actual production... No. 20's flexibility, ease of operation and maintenance, and long life account for its popularity where speed plus precision is essential.

Covell No. 20 (6" x 18") Hydraulic Surface Grinder is described in Bulletin MM-93. Write, wire or phone for your copy today.

**PROMPT DELIVERY TO WAR INDUSTRIES**



# COVEL

Grinding Machinery Since 1874

## INDUSTRIAL GRINDERS

COVEL MFG. CO., BENTON HARBOR, MICH.

# POT FURNACES

that last longer

## Consider These Facts Before You Buy a Pot Furnace

- Surface Combustion supplies over 60 different standard pot furnaces—rated as to capacity and output.
- Burner application prevents flame impingement on pot surface—materially increases pot life.
- Location of burners utilizes maximum available pot surface for heat transfer, thus giving fast, efficient heating.
- Design of top plate and pot ring permits easy removal of pot for inspection and provides seal to prevent leakage of liquid bath into combustion chamber.
- Drain and inclined bottom prevent accumulations in bottom of furnace.
- Sturdy construction of first quality materials, combined with careful workmanship, assures long life with minimum maintenance.
- Produced by the largest manufacturer of gas-fired industrial furnaces in the world.

**SURFACE COMBUSTION • TOLEDO, OHIO**

# SURFACE COMBUSTION

INDUSTRIAL FURNACES • JANITROL GAS-FIRED SPACE HEATING EQUIPMENT • KATHABAR MOISTURE CONTROL SYSTEM



*Thanks to the*

**SUNNEN  
PRECISION  
HONING  
MACHINE**

# GIRLS IN 'TEENS

**are handling jobs in "tenths"!**



Aluminum Aircraft Link "produces high finish without bell-mouthing."



Inner Bearing Ring "Accurately removes last 'tenths' of stock."



Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.



Cones for Wheel Balancing Machine "Accurately align hones two interrupted surfaces."



Aviation Hydraulic Cylinder made of Aluminum Alloy. Improves the quality of the bearing surface. An extremely smooth surface-finish is secured.



Aircraft Valve Tappet Roller. 4-micro finish.



and they can be trained in a few hours.

The guaranteed accuracy (.0001") and super-smooth finish (2 to 3 micro inches) assure fewer rejects and interchangeability of parts.

**Low in Cost—Economical to Operate**

The basic price of the Sunnen Precision Honing Machine is only \$195! And it's economical to operate.

No jigs or fixtures—work is held in hands. Relieves big internal grinders for other jobs.

Wide range—handles any internal diameter from .185" to 2.625".

Find out what Sunnen equipment can do for you on your job—one of our engineers will be glad to call and help you solve your problems. Or—if you prefer—write for free bulletin giving complete information.

**SUNNEN**

**SUNNEN PRODUCTS COMPANY, 7933 Manchester Ave., St. Louis, Mo.**  
Canadian Factory: Chatham, Ontario



The coveted Army-Navy "E" waves over the Sunnen plant—evidence of the important part Sunnen equipment is playing in the war effort.

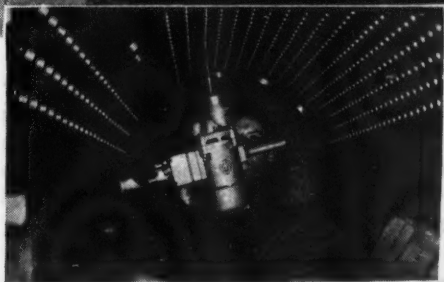


# Developed Especially

## FOR ROLLING TUBE ENDS IN D.E. BOILERS



(Official U. S. Navy Photograph)



CP No. 939 Electric Reversible Flue Roller, while designed especially for builders of D. E. vessels, is ideal for rolling tube ends in any small boiler drum. Rolls 1" or 1½" tubes. Only 14½" overall. Weighs only 17½ pounds. Write for complete data.

\*\*\*\*\*  
PNEUMATIC TOOLS  
ELECTRIC TOOLS  
(Nixyle...Universal)  
ROCK DRILLS

CHICAGO PNEUMATIC  
TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

\*\*\*\*\*  
AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES

# IT'S JUST PLAIN COMMON SENSE

Every shop has its non-productive operations. Some can't be avoided. But every one slows up production and adds to costs. So it's common sense, and good business as well, to eliminate every non-productive move you can.

A non-productive operation in the drilling department is the tightening and retightening of drill chucks with keys. A check-up of the amount of time used up in this operation would probably surprise you. It is a needless waste of time because it can be completely eliminated by equipping your drill presses with . . .



**MADE IN 5 SIZES**  
for No. 0 to  $\frac{5}{8}$ " drills.  
Available also for  
portable drills.

## *Ettco-Emrick* **KEYLESS** **DRILL CHUCKS**

These chucks are self-tightening. All the operator has to do is insert the drill and turn the knurled body by hand just enough to hold it. Drilling action does the tightening—and the heavier the load the tighter the hold—so retightening is never necessary. They're the ideal chucks for girl operators because no strength is required.

**BULLETIN No. 6** gives you full details about Ettco-Emrick Keyless Drill Chucks, including the high quality and precision construction that assures you of long, hard, trouble-free service. A copy will be mailed to you on request. Write for it today.

## **ETTCO TOOL CO.**

598 Johnson Ave., Brooklyn 6, N. Y.  
DETROIT • CHICAGO

**25 YEARS OF SPECIALIZATION IN MACHINE TAPPING EQUIPMENT**



## **T**hey're setting 'em up for Smiling Billy, tonight!

**SURE** and there are those who'd punch the nose of the man who wouldn't lift one to Billy, tonight — in a dignified fight, of course.

For we've turned back the timeclock to March 7, 1903, when Smiling Billy had a hand in the destiny of a great American industry. . . . He fought a battle with a giant turbine, while history hung in the balance.

He was a shop foreman in one of the early plants of General Electric. His company had pioneered research in turbine engineering, and had staked its reputation on the plans of the first commercial steam turbine generator. It was to be a gigantic machine, and the Commonwealth Edison Company of Chicago had courageously designed their entire new Fiske Street generating station around the plans for this unborn behemoth. . . . The date they had set for the official test was March 7, 1903.

By February, the turbine was still months from completion. A meeting of foremen was called. "Who among our general foremen is 100 per cent qualified to complete the building of

the turbine on time?" they were asked. A single name had the vote of every man there.

The story of Billy's battle with the turbine is a minor classic of one man's knowledge of machinery, tools and men. Around him lay thousands of unfinished parts. Ahead of him lay the task of assembling a machine as big as a two-story house and as delicate as a lady's watch — that could shatter itself to pieces from a microscopic error in tolerance.

He won. On March 7, less than three weeks from taking over, Smiling Billy waved a grimy hand, and the first big turbine generator began to whine a brand new song of power.

History is made that way. It's being made that way today, in the biggest battle of all time, because many of the great men of industry are men with grease on their hands.

Today, Jones & Lamson machine tool engineers are working with those men on hundreds of America's most important assembly line jobs — and have been from the very beginning of every great industry in America. They were there in the days of Smiling Billy, and they'll be there tomorrow when you call!



# **JONES & LAMSON**

Universal Turret Lathes • Fay Automatic Lathes • Automatic Thread Grinders • Optical Comparators • Automatic Opening Die Heads

**MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.**  
Profit-producing Machine Tools

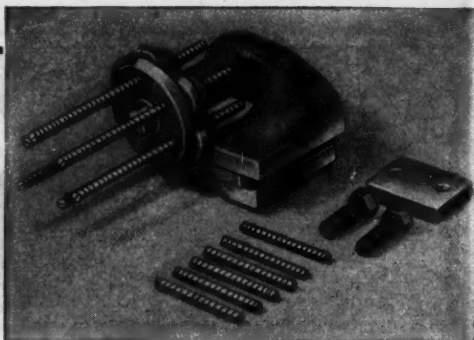
AMERICAN MODEL CS-1

## MULTIPLE CARRIAGE STOP

SETS 6 STOPS FOR  
DUPLICATE OPERATIONS

MODEL CS-1 FITS ATLAS, LOGAN,  
SOUTH BEND AND SIMILAR  
LATHES.

COMPLETE **\$1875**



- ACCURATELY GAUGES LENGTH OF CUTS
- PREVENTS ERRORS AND REJECTIONS
- ANY ONE OF 6 STOPS AVAILABLE
- STOPS ARE NUMBERED AND INDEXED

## MULTIPLE CROSS SLIDE STOP

SETS 6 DIAMETER STOPS FOR REPEAT OPERATIONS



AMERICAN MODEL DS-1

- PREVENTS SPOILED WORK
- INCREASES PRODUCTION
- MAKES IT UNNECESSARY TO  
WORK BY DIAL GRADUATIONS

All necessary parts are supplied with  
each Multiple Cross Slide Stop.

IMMEDIATE SHIPMENT FROM STOCK. RUSH ORDER AND PRIORITY TODAY.

MODEL DS-1 FITS ATLAS, LOGAN, SOUTH  
BEND, AND SIMILAR LATHES. COMPLETE

**\$1985**

## SCHULTZ & ANDERSON CO.

110 EDISON PLACE, NEWARK5, N. J.

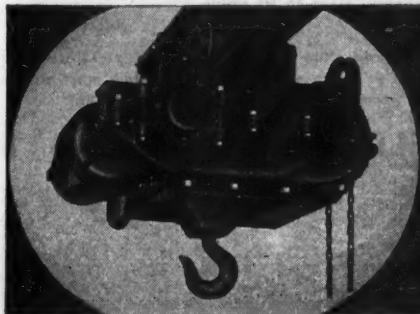
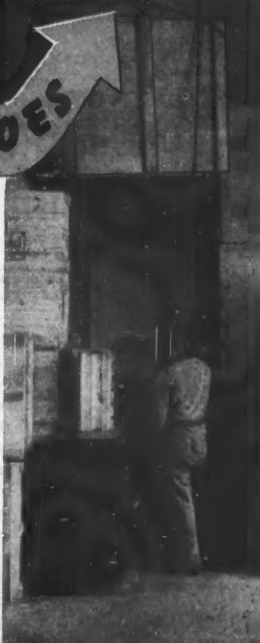
LIFT THE LOAD **HIGHER** AND *Faster*  
WITH *Northern*  
HIGH-LIFT LOW HEADROOM  
**ELECTRIC HOISTS**

**LOOK WHERE THE HOOK GOES**

The high hook lift-low headroom feature of Northern Electric Hoists will add 12" to 36" to the working height of your building—without extra expense—without altering the building. This means better use of storage space, easier handling of bulky loads, faster operation because clearances are greater.

Northern Hoists are also superior in strength, lifting power, speed, and handling.

**Write for Booklet No. 26**



*Northern*  
**ENGINEERING WORKS**

2615 Atwater Street, Detroit, Michigan  
Offices in Principal Cities

Northern Crane & Hoist Works Limited,  
Windsor, Canada

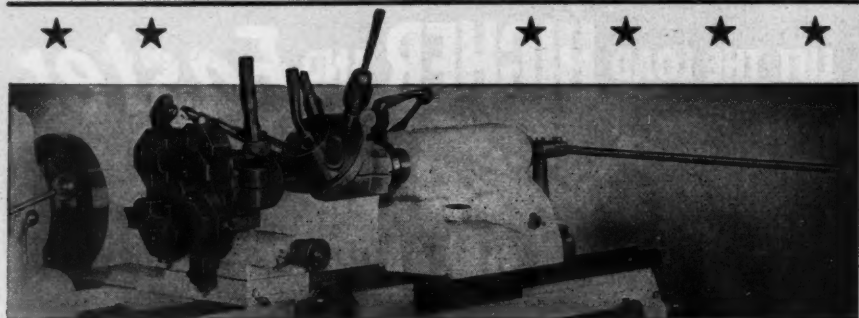
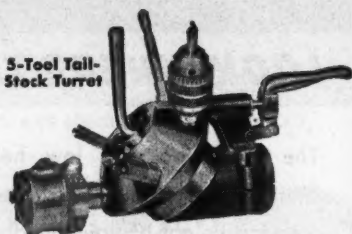


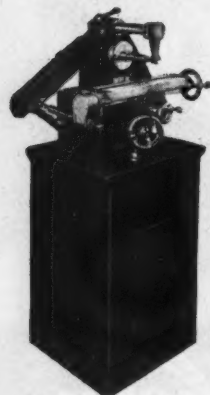
Photo above shows Jefferson Turrets on 16" lathes

# Convert

## YOUR ENGINE LATHE INTO A TURRET LATHE IN 15 SECONDS



5-Tool Tail-Stock Turret



We also Manufacture the Jefferson Bull Dog Precision Milling Machine.

DELIVERY 3 WEEKS

Yes, it's as easy as that! You simply attach the Jefferson Tail Stock Turret, the Jefferson Tool Post Turret, and the Jefferson Adjustable Pull Feed to your lathes as shown in illustration.

The productive capacity of these machines will be more than doubled in many instances because there will be available at all times **NINE DIFFERENT TOOLS.**

With these three **JEFFERSON** time-saving devices attached to a lathe, any kind of work may be done, such as forming, roughing, boring, finishing, knurling, drilling, tapping, etc., without stopping the lathe, or changing tools. **THE JEFFERSON TURRETS** are made very substantial, rigid, accurate and in several sizes to fit small bench lathes up to 24" swing.

Jefferson Turrets are real production tools — substantial, rigid, accurate and adaptable to any size or make of engine lathes. They must not be confused with the small makeshift gadgets now on the market.

PAT. PENDING



4-Tool Tool-Post Turret

### TURRET DELIVERIES IN 6 DAYS

# JEFFERSON MACHINE TOOL CO.

750 W. Fourth St., Cincinnati, Ohio

Tool-Post Turrets, Tail-Stock Turrets, Adjustable Pull Feeds, Belt Sanders, Gyro-Foundry Riddles, Overhead Swing Frame Grinders, Milling Machines, Dividing Heads and Vises.

# DO-ALL

## *Cuts any material*

What have you that needs quick, smooth cutting—Metals? Alloys? Plastics? Plymetals? Rubber? Laminated Products? Composition Materials?

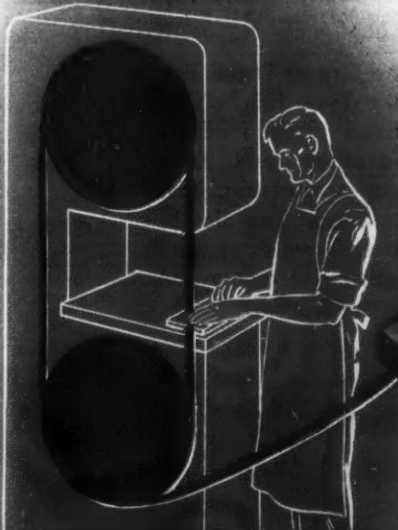
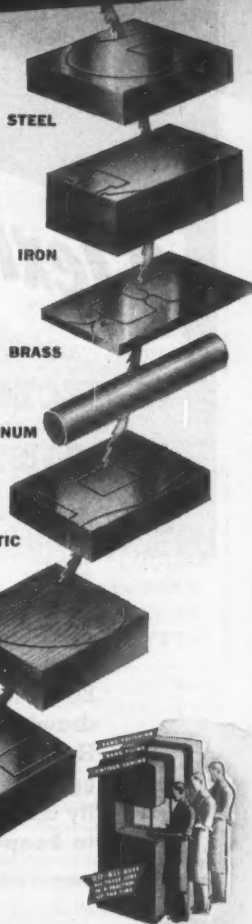
Armed with a DO-ALL Contour Machine and a supply of tough-edged

DO-ALL Band Saws, you can tackle any internal or external sawing job—flats, bars, tubing, blocks a foot thick, stacked sheets, etc.

Just thread the DO-ALL with the proper band saw and you have ready for instant use Today's Fastest Machining Method—Meets the Challenge for Greater Production.

Six models—built for greater speed and a smoother finish—priced from \$1,000 to \$5,000 with motors.

Everyone interested in advanced shape cutting methods, should see the 265-page DO-ALL Handbook giving details about this amazing machine. Free copy on request.



### CONTINENTAL MACHINES, Inc.

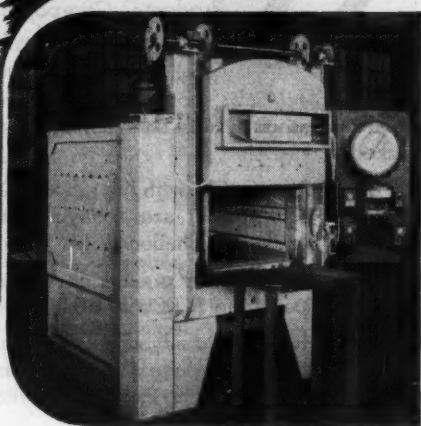
1306 S. Washington Ave., Minneapolis 4, Minn.

DO-ALL Offices in 25 cities, with a staff of trained engineers to give you quick service on Contour Machines, Band Saws and Files, Gage Blocks and Surface Grinders.



**Flexibility**

**IS NECESSARY IN  
A MAINTENANCE  
SHOP**



In the maintenance shops of the Grand Trunk Railroad at Battle Creek, Michigan, a Type HD-247218-A Box Furnace, as shown, is used for the critical drawing of engine springs and other parts. Other Hevi Duty furnaces are used for carburizing, hardening and subsequent heat treating. The flexibility and accuracy of these furnaces have done much to keep rolling stock maintenance at a low cost.

**SEND FOR BULLETINS HD 341 and 441**

**HEVI DUTY ELECTRIC COMPANY**

HEAT TREATING FURNACES **HEVI DUTY** ELECTRIC EXCLUSIVELY  
MILWAUKEE, WISCONSIN

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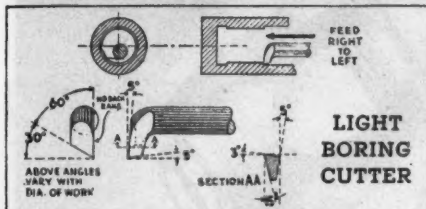
TOOL

# HOW AND WHY

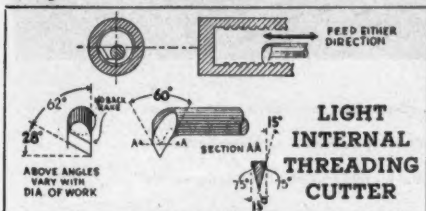
## WILLIAMS' TOOLS AID WAR PRODUCTION

### GRINDING CUTTERS FOR WILLIAMS' TOOL HOLDERS

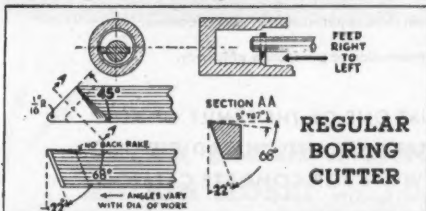
**DATA SHEET B**, covering the various cutters used with Williams' Boring Tools in machining cast iron and steel.



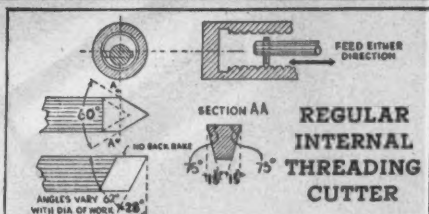
Above cutter is used with Williams' Light Boring-Tool Holders, Nos. 15, 16 & 17. Grinding instructions for the square, turning cutter furnished with these Holders were given in DATA SHEET A of this series.



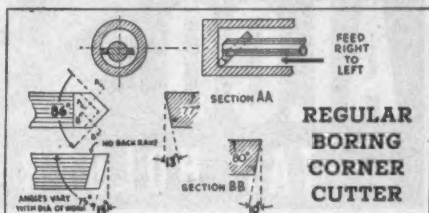
Above cutter is used with Williams' Light Boring-Tool Holders, Nos. 15, 16 & 17. Instructions given are for regrounding for internal thread cutting. This cutter is furnished ground for boring as in first illustration.



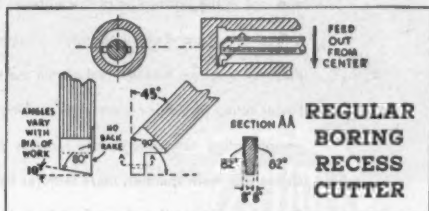
Above cutter is used with Williams' Adjustable Boring Tool Posts Nos. 2, 3, 4 & 5 and with Williams' Boring Tool Holders, Nos. 080, 80, 81, 82 & 83.



Above cutter is used with Williams' Adjustable Boring Tool Posts Nos. 2, 3, 4 & 5 and with Williams' Boring Tool Holders, Nos. 080, 80, 81, 82 & 83.



Above cutter is used with Williams' Adjustable Boring Tool Posts Nos. 2, 3, 4 & 5 and with Williams' Boring Tool Holders, Nos. 080, 80, 81, 82 & 83.



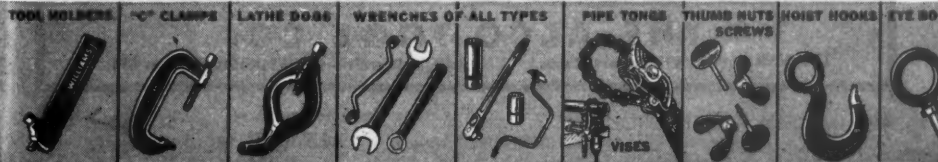
Above cutter is used with Williams' Adjustable Boring Tool Posts Nos. 2, 3, 4 & 5 and with Williams' Boring Tool Holders, Nos. 080, 80, 81, 82 & 83.

Data Sheet A on this subject appeared last month. Additional Data Sheets on the grinding of other cutters for Williams' Tool Holders will follow.

**WILLIAMS**  
Headquarters  
for over half a century for  
**DROP-FORGINGS and DROP-FORGED TOOLS**

Sold by Leading Industrial Distributors Everywhere... J. H. Williams & Co., Buffalo 7, N. Y.

© J. H. W. & CO., 1943



# ALCO

## TAP HOLDERS



Because the screw machine industry is of such tremendous importance in this modern war age in the production of the material to help bring peace as quickly as possible, it behooves each and every operator to see to it that his tool holders are so designed that they will lengthen tool life and obtain the maximum of production perfection.

Faster set-up, the elimination of all bushings, uninterrupted production, and adjustable, compensating concentricity are features provided by all ALCO TOOLS. On old machines with worn spindles, these features help overcome imperfections in work produced.

On new machines, they form an unbeatable combination of production efficiency.

THE TAP HOLDER SHOWN ABOVE IS JUST ONE OF THE FAMILY OF ALCO TOOL HOLDERS FOR ALL DRILLING, TAPPING AND THREAD CUTTING OPERATIONS ON SCREW MACHINES. WRITE FOR COMPLETE CATALOG.

# ALCO TOOLS

## THE ALCO TOOL CO.

152 Birdseye St., Bridgeport, Conn.

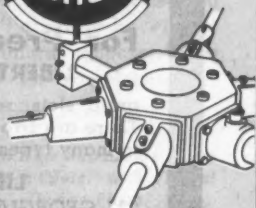
Detroit Office: 908 Stephenson Bldg.

**THAT'S NO WAY TO  
BEAT THE AXIS, SON!**

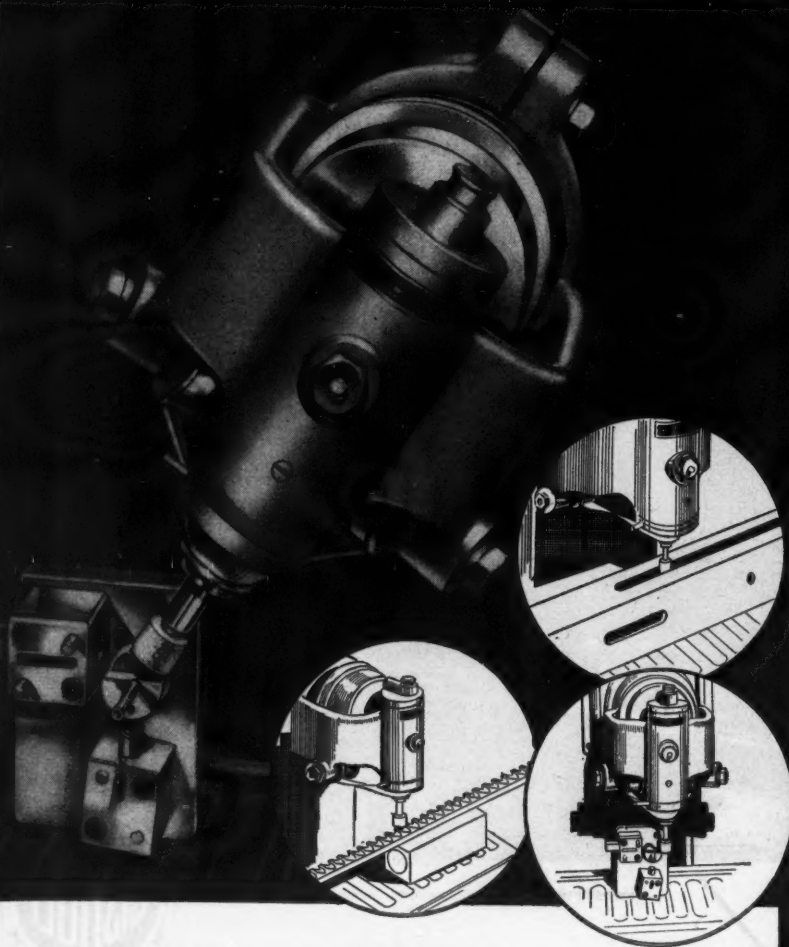


**✓ NEVER CLEAN A MACHINE WITH  
AN AIR HOSE!**

Strong blasts of air can blow fine chips and dirt into small clearance openings and bearings where they may lodge and cause serious failures.



- ★ Reprints of this page on enameled paper in 9" x 11½" size are available for bulletin board use in your turret lathe department. Write the Gisholt Machine Company, 1219 East Washington Avenue, Madison, Wisconsin. Ask for the series of "War-Time Care and Operation Posters."



## For Precision and Economy LIBERTY HIGH SPEED GRINDING ATTACHMENTS

grind slots, recesses and hard-to-get-at surfaces to closest tolerances. There are two models, Horizontal and Vertical... each can be assembled to many types of grinders... assembly time may not exceed two minutes.

**LIBERTY TOOL AND GAGE WORKS, INC.**

237 GEORGIA AVE.

PROVIDENCE, R. I.

*With Plant Facilities for Producing Precision Aircraft Parts*

# Tomorrow's Tools for Today's Tasks

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# New CLECO 41-L Squeezer



★ The faces of the riveter arm dolly and the anvil arm dolly of the Cleco 41-L Alligator Squeezer are always parallel regardless of the amount of gap. This exclusive feature prevents disalignment ("clinched rivets") and loss of rivets; it insures tight rivets with uniform heads, and does not cause distortion in the surrounding metal.

The 41-L is new in design, but is built to the same uncompromising quality standards that have distinguished Cleco Tools for so many years.



This squeezer is light and powerful; it weighs only 5½ lbs., is 12¼" long, and has a ⅞" rivet capacity. The working gap is 15/16", with full opening of 1½". It is equipped with automatic return throttle, and adjustable pressure "pop-off," as well as return limit stop on alligator jaw.

To meet your wartime production schedule you can't afford to be without this unique squeezer. Write now for complete information.

\* The New Repairable Cleco Sheet-holders with Latest Design Pliers.

**THE CLEVELAND PNEUMATIC TOOL CO.**  
**MARBLE AVE. & E. 77th ST. CLEVELAND, OHIO**  
BRANCH OFFICES IN ALL PRINCIPAL CITIES

*Revolutionizing*  
**METAL CUT-OFF  
OPERATIONS**



**Kalamazoo**  
**METAL CUTTING BAND SAW**

**CUTS SOLIDS—TUBES—ODD SHAPES—OR GANGS—Faster and More Accurately.**

The Modern method for handling 95 per cent of all cut-off work. **FASTER**, as cutting action is continuous. **MORE ACCURATE**, as it makes a wafer-thin cut to close tolerances.

Small investment—low upkeep and depreciation—and easy set-up.

**COOLANT ATTACHMENT** for production cutting or for hard metals. Saves Saws and triples speed.

Two sizes — Four speeds. Portable — plugs in anywhere.

*Increases*

**SPEED**

**PRODUCTION**

**ACCURACY**

**CAPACITY**

**SAFETY**

*Saves*

**TIME**

**LABOR**

**MACHINES**

**TOOL STEEL**

**MAINTENANCE**

**MACHINE TOOL DIVISION**

**KALAMAZOO TANK & SILO CO.  
KALAMAZOO, MICHIGAN**

Good giving most tool-sa Portab Gr hundr ing, s cutting either Sturdi in bot 50 to from \$ If small, have a Mills GRAY

*a coolant transfusion...*



Here's a Gray-Mills model H-10A giving high efficiency Coolant application service.

## ...to increase Tool Life and Production

**G**OOD machines can be made to do a better job by giving them a Coolant "Transfusion." And the simplest, most efficient way to apply these production-increasing, tool-saving coolants is with Gray-Mills "Controlled Flow" Portable Coolant Systems.

Gray-Mills Systems have increased the efficiency of hundreds of machines on operations like drilling, milling, sawing, grinding, honing, tapping, threading and cutting. They are quickly and easily set up to operate either as a permanent or temporary part of a tool. Sturdily built Gray-Mills Coolant Systems are available in both gear and centrifugal types, with capacities from 50 to 2,000-gal. per hour—controlled flow. Prices range from \$39.50 to \$189.50.

If you want to modernize your older machines—equip small, large or special tools for greater efficiency—or have a "standby" and "cleanout" system there is a Gray-Mills for the job. Call your distributor or write direct.

**GRAY-MILLS CO., 207 W. Ontario Street, Chicago, Illinois**

**PROMPT DELIVERIES**

Send for the new Gray-Mills Catalog—it gives full details.



**STANDARD  
HEAVY  
DUTY  
"A" SERIES**

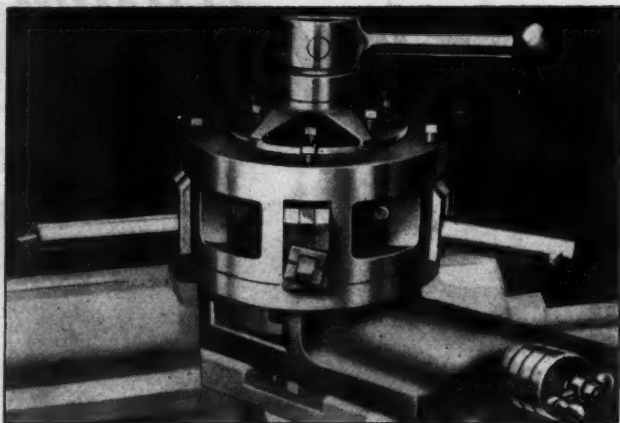
With large capacity tanks incorporating baffles and screens. Capacities up to 165 gals. per hour—pressure, 50 lbs. p.s.i.



**MODEL "G" SERIES**  
Capacities up to 130 gals. per hour—pressure, 30 lbs. p.s.i.

*...complete portable coolant systems*

**GRAY-MILLS**



## 5 STATION LATHE TURRETS TO INCREASE PRODUCTION APPLICATIONS ON ALL ENGINE LATHES

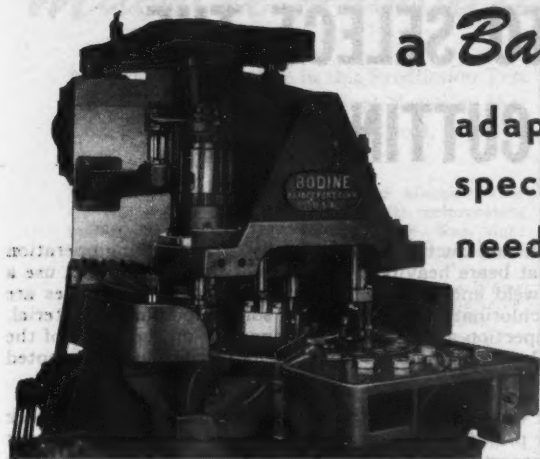
It is a simple matter to convert your engine lathe to a turret lathe for increased production and better finish if you adopt the 5 station lathe turret.

You can select any one of 10 different positions simply by making a slight turn of the handle and then lift it to a 45 degree position. Tool bits can be rotated or lifted in any position for accurate settings and cutting efficiency.

These 5 station lathe turrets are unsurpassed for roughing—boring—forming—drilling—finishing, etc. They are ruggedly built for long life.

*Write for circular containing helpful information  
on this tool and other items of interest to all lathe  
users. Write today.*

**AUTOMATIC MACHINE & TOOL COMPANY**  
132 CHARLES ST. • AUBURNDALE, MASS.



# a Basic design adaptable to *your* specific production needs and speeds

To key men concerned with small part production Bodine recommends serious consideration of this Basic design...a perfected coordination of vari-located spindles and an automatic horizontal indexing dial.

Investigation, thru our engineering department, will disclose practical adaptations of this principle—one or more of which may solve your toughest problems.

## DRILLING, MILLING, TAPPING, SCREW INSERTING *Simultaneously*

Multiple spindles may be located at successive stations to operate vertically, horizontally or from inverted positions, on work held in clamps on the automatic indexing dial.

For highspeed repetitive production, especially where several operations are required on each part, drilling, milling and tapping may be performed simultaneously, during one cycle of the dial. Moreover, screw inserting can be added if necessary.

There are six standard Bodine machines, each of which is adaptable for a wide variety of set-ups. They carry from 6 to 8 spindles, drill holes up to  $\frac{1}{2}$ " dia. with vertical stroke to  $3\frac{1}{2}$ " depth.

Operators may be quickly trained as both set-up and feeding are simplified. In most cases the parts are hand fed and automatically ejected. Electrical interlocks protect tools, machine and operator.

Study the operations shown at right...they are typical of the many possibilities of these highly diversified machines.

Production recommendations will be made from your sample parts or blue-prints. Send for Bulletin for detailed information.



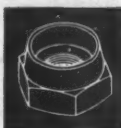
### TYPICAL OPERATIONS FOR 540-10

Tooled for processing contact blades for attachment plug caps. Operations: Tapping 6-32 hole, inserting binding screw (automatically hopper fed to screw driving spindle), spinning (or staking) screw on end, backing up screw, insert and eject. High-production, accurate finish.



### TYPICAL OPERATIONS FOR 542-30

This special (Bodine patented) set-up is for rapid production of accurately located holes in a delicate ordnance component. Operations: seven holes drilled (sizes .5mm to 2.8mm dia.) with tolerance for center distance .0004". By changing dials and relocating spindles many different set-ups can be made on a single machine.



### TYPICAL OPERATIONS FOR 548-20

Here is a dial and tooling arrangement for producing a special type nut. Blanks are hand loaded to dial. First spindle drills for equivalent of a counterbore diameter. Second spindle drills the tap hole thru the blank, and next spindle taps the hole to class 3 fit, square with face of blank. Two completed nuts to each stroke of machine. Speed depends upon size of nut and material.



### TYPICAL OPERATIONS FOR 548-30

To drill and thread this  $\frac{1}{4}$ " malleable iron pipe union nut, heavy duty drilling and threading spindles (2 of each) are provided. The collapsible taps produce the thread in minimum time. Operations: Ream 2 diameters and seat, tap  $\frac{1}{4}$ " — 12 T.P.I. Even semi-skilled operators obtain maximum production.



# How TO SELECT THE RIGHT CUTTING FLUID

1. **For Machining Nickel Steel**, and ductile steels generally, if the cutting operation produces a curling chip that bears heavily on the face of the cutting tool, use a cutting fluid high in anti-weld and anti-friction properties. Such properties are generally found in sulpho-chlorinated oils containing some saponifiable material. If visibility and ease of inspection are also of importance the oil should be of the transparent type. Chillo Oils No. 140 or No. 143 will be found particularly adapted for service of this kind.
2. **For Similar Operations** but where transparency is not a factor and where the work warrants the use of a lower priced product of the sulphochlorinated type, without saponifiable material, we recommend Cities Service Grade A Cutting Oil. This oil has many satisfied users.
3. **For Less Severe Operations** these base oils can be had in milder concentrations to meet varying requirements—of tool life, finish, cost, etc.
4. **If Maximum Protection Against Staining** is a factor, or if a high degree of transparency is desired, in moderately severe operations, a mineral-lard oil in varying proportions, like Chillo Oils 1 to 5, will be found particularly applicable for the purpose.
5. **Where Cooling Is Of Paramount Importance**—as in grinding operations—to assure accuracy and prevent distortion—oil-water emulsions frequently are desired. This type of cutting fluid is also often selected for operations where cost is a deciding factor. We suggest Cities Service Soluble Oil for these requirements.

FOR COMPLETE CUTTING OIL MANUAL, WRITE TO CITIES SERVICE OIL COMPANY, SIXTY WALL TOWER, ROOM 1696, NEW YORK 5, NEW YORK. FREE TO THE PERSONNEL OF USERS OF CUTTING OILS.



\* \* \* OIL IS AMMUNITION — USE IT WISELY \* \* \*

# Machine Production Doubled!

Note the grinding time in this Production Test Run — a generous 50% saving! Note also that Cortland Segments cut fast and cool, with less wear, and require no dressing.

*Production Test Run on Abrasive Machine Tool Co. No. 34 Vertical Surface Grinder with reciprocating table. Wheel speed, 2570 R.P.M. Work: Rear sight base for 30 cal. gun: Arma steel casting; 4 pieces per table load.*

|                    | 6" Cup Wheel<br>Competitive<br>Make |                   |
|--------------------|-------------------------------------|-------------------|
| Total Feed.....    | .015                                | .013              |
| Stock Removed..... | .010                                | .010              |
| Wheel Wear.....    | .005                                | .003              |
| Grinding Time..... | 2 min.<br>40 sec.                   | 1 min.<br>12 sec. |

Send for the new bulletin that illustrates and describes Cortland Chuck and Segments.

## DIAGONAL SHEARING

Shock and resistance minimized as narrow end of segment starts grinding action. Large surface still exposed to coolant. Diagonal motion of straight inner edge of segment produces powerful shearing action. Increasing contact combines rapid stock removal with minimum heating.

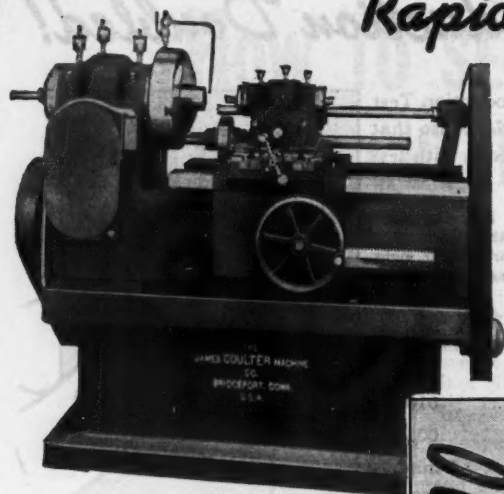
Maximum area of segment in contact with work momentarily. As segment continues to pass across work, grinding area becomes smaller, with more surface exposed to coolant.



# CORTLAND Segmental Chucks

CORTLAND GRINDING WHEELS CORP. • CHESTER, MASS.

# Rapid Duplication

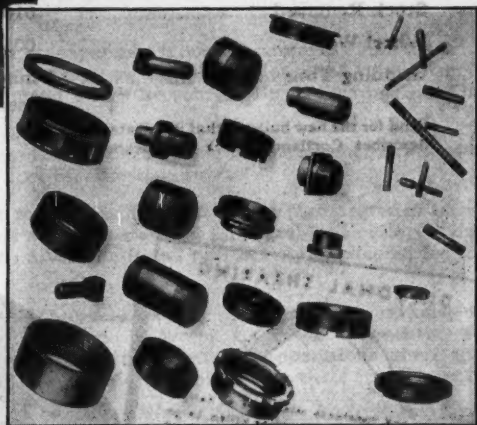


of  
**RIGHT OR LEFT HAND  
THREADS**

**INTERNAL OR EXTERNAL**

**COULTER**

Type "H"



Any parts that can be held in ordinary chucks, air operated chucks, air operated collet chucks, or special face plate fixtures... can be threaded on this machine.

Set cam-controlled automatic cycle on first piece. Thereafter, cutter feeds into work to proper depth and at correct pitch and withdraws when cut is completed. Work and cutter spindles are driven by individual motors through worm drive, affording ample power throughout the wide range of feeds and speeds.

Write for complete specifications.

*The James* **COULTER** *Machine Co.*  
**BRIDGEPORT • CONNECTICUT • U.S.A.**

*Tips for faster,  
more accurate  
Tapping!*

FOR TAPPING TWO HOLES in one piece, a Haskins Two Spindle Tapper—with Piece Part Control—substantially speeds up production.

In the operation above (aluminum fuse bodies), two holes of different sizes are tapped by one operator, on one machine.

Parts are placed in the fixture, pressed against pins operating micro switches and—air does the rest. With both hands free, the operator can handle parts faster—much faster. Everything else is automatic.

The accuracy of the work is constant—uniformly controlled by air! That's why there is no tolerance problem on Haskins Tappers. Why each part is tapped exactly like each other—to Class 4 fit when necessary.

Tapping the Haskins way is faster, definitely more accurate, definitely less costly. R. G. Haskins Company, 620 S. California Avenue, Chicago.

European Representative: G. E. Marbais, Ltd.,  
Humbly House, London, S.W.1



**HASKINS**

*Precision*

**TAPPING  
EQUIPMENT**

FOR ADDITIONAL TAPPING TIPS send for our latest literature, devoted largely to war work. Gives many money-saving, money-making ideas. Free on request.

**NEW! WET-CUTTING MODEL  
FOR ULTRA HIGH SPEED METAL CUTTING  
JOHNSON  
METAL CUT-OFF BANDSAW**



**CAN ALSO BE ADAPTED TO EXISTING  
JOHNSON DRY-CUTTING BANDSAWS**

The Johnson Coolant Model offers unusual advantages for production requiring exceptionally high-speed . . . on some jobs increases as high as 200% can be attained . . . Longer blade life assured!

- ★ **NO SEPARATE MOTOR REQUIRED**—one power source does cutting and operates coolant pump. No special wiring or switches necessary.
- ★ **COOLANT FLOWS AUTOMATICALLY**—Machine speed controls flow of coolant in direct proportion to speed of blade.
- ★ **BLADE WIPERS** remove coolant after cutting; no danger of bearing lubricants.
- ★ **PUMP SHAFT** runs on bronze bearings, quietly, efficiently; handles any cutting fluid.
- ★ **DRY CUTTING** may be handled by simply disconnecting pump.

**JOHNSON MFG. CORP. ALBION, MICH.**

*Write today for descriptive literature to Sales Office, 5003 Chrysler Bldg., New York*

# *In the Production of* **JUST ONE GUN PART**

## **BROACHING**

**HAS SHOWN THIS SAVING  
IN MEN AND MACHINES**

In one of our Arsenal's 61 men and 61 machines were engaged in machining a certain gun part. Now the same rate of production is maintained on the same part by 8 men and 8 broaching machines. This means that 53 men and machines are available for other work. It means that the cost of these parts is greatly reduced.

If you find it difficult to meet production schedules with your present equipment you undoubtedly can step up your production by broaching.



BY BROACHING  
**8 MEN - 8 MACHINES**



BY FORMER METHOD  
**61 MEN - 61 MACHINES**

Much of the increase mentioned above, for instance, was made by broaching several surfaces in one stroke.

On a production problem that broaching will solve, talk it over with a Detroit Broach man. There's no obligation, of course.

**COMPLETE BROACH SERVICE**



**DETROIT BROACH COMPANY**

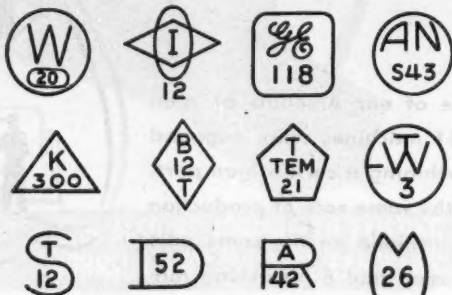
20201 SHERWOOD AVENUE • DETROIT, MICHIGAN

ANY DESIGN OR LETTERING

*Reproduced in "Safe-Hed"*

# STEEL STAMPS

Matthews skilled craftsmen will accurately reproduce your trade mark...symbol...monogram...special lettering or design in sturdy built, "Safe-Hed" Steel Stamps...for inspection marking of your products or work identification stamping. Here are a few typical examples:



**Write for Bulletin A-1**

This valuable bulletin illustrates hundreds of stock symbols, and ideas for special designs for inspection or work identification stamping. Write for your free copy today.

## JAS. H. MATTHEWS & CO.



3944 Forbes Street Pittsburgh, Pa.

Branch Plants

New York, Boston, Chicago, Philadelphia, Newark, Syracuse

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Detroit

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Birmingham

# 5 DAYS OUTPUT IN 4!

*That's Why 70% of All Sales*  
**ARE REPEAT ORDERS...**



## LIPE

*Pneumatic*  
**BAR FEED**  
*puts the "prod"*  
*in production*

★ No wonder 70% of the sales of this air-operated bar feed are repeat orders. Nearly everywhere it's tried, it jumps screw machine production an easy 20% ... producing in 4 days the same number of pieces formerly turned out in 5.

★ More—it cuts scrap losses, rejects, refinishing operations on polished pieces. Feeds exact-size, polished stock to the last possible remnant—never feeds short. Has no feed fingers to scratch bars, or deform thin-walled tubing. No related feed-finger parts to jam, stick or cause trouble. Above all, no whipping ends to catch clothing or injure passers-by. Every bar is fully inclosed, automatically set up and easily loaded.

★ Get the facts now. Write or wire for literature, or for consultation with a nearby Lipe technical representative. No obligation.

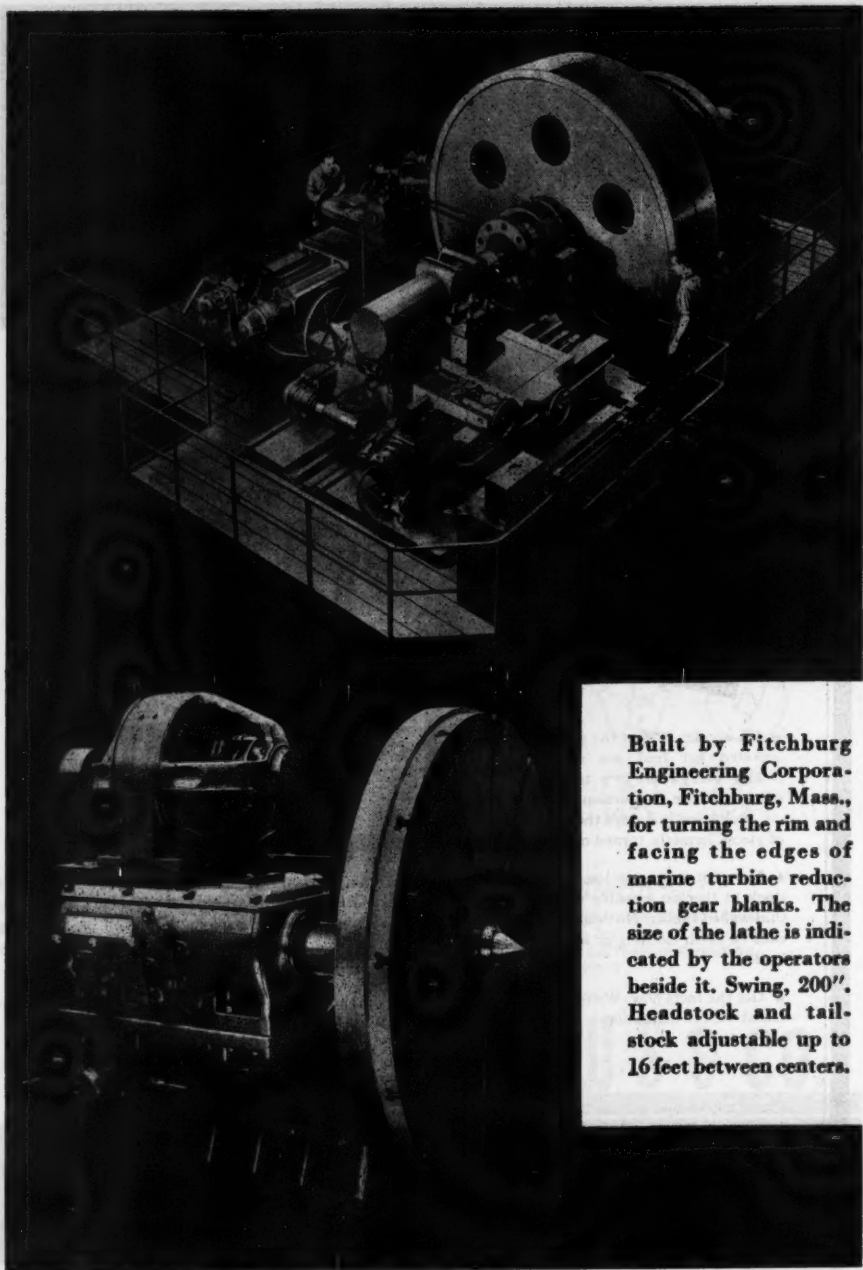
★ Available for all single spindle Automatic and Hand Screw Machines. Prompt delivery.



## LIPE

**-ROLLWAY CORPORATION**

SYRACUSE, N. Y.



Built by Fitchburg Engineering Corporation, Fitchburg, Mass., for turning the rim and facing the edges of marine turbine reduction gear blanks. The size of the lathe is indicated by the operators beside it. Swing, 200". Headstock and tailstock adjustable up to 16 feet between centers.

# No, we didn't build this lathe...but A MONARCH HEADSTOCK DRIVES IT!

Selection of Monarch headstock for this Fitchburg lathe is evidence of the power and dependability of the Monarch mechanism. Its "huskiness" and rigidity amply qualify it for this work, and the 30 hp motor provides plenty of driving power.

Few manufacturers require equipment of this type. However, every user of lathes must be sure that his equipment has the stability, the toughness, the rigidity and the power, com-

bined with unfailing accuracy in performance to carry out the requirements of his work.

The selection of Monarch lathes, for a wide variety of work in war production, was based upon their proved productivity in peacetime. These same qualities are being maintained and amplified, today.

Manufacturers planning their peacetime operations are invited to consult with Monarch engineers, on their lathe requirements.

**MONARCH LATHES**  
*Save Time*



THE MONARCH MACHINE TOOL COMPANY • SIDNEY • OHIO

September, 1943

MODERN MACHINE SHOP

61

# MATTISON ABRASIVE BELT GRINDING AND POLISHING MACHINES

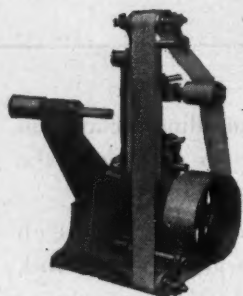
★ Results obtained in a number of plants definitely establish the use of factory-coated abrasive belts as a most efficient practice. Besides reducing the number of rejections and improving the finish, they have cut the polishing cost per piece through increased production.

However, to secure full benefit from factory-coated abrasive belts, the right type of mechanical unit is necessary. The machine is all important for properly applying the abrasive to the particular job to be done.

Mattison Abrasive Belt Grinding and Polishing Machines are engineered with a knowledge of the factors involved to give the best application of belts. From the time factory-coated abrasive belts were introduced for metal grinding and polishing, Mattison's have developed and built machines to provide best results.

They are built for both the wet and dry grinding method. In addition to the finishing of metal parts, they are used for plastics, hardened rubber, fibre, glass, etc. In fact, the applications are so numerous, only a few can be mentioned and shown on this page.

Whatever your problems may be, it is well worth while to make an investigation as to the machine available for handling it.



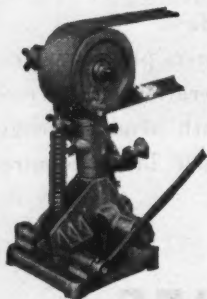
**Mattison J-115 Variety Belt Grinding and Polishing Machine for flat and curved surfaces.**



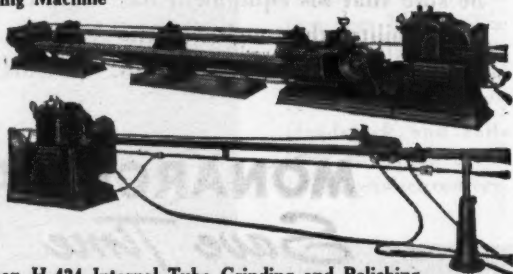
**Mattison S-441 Grinding and Polishing Machine**



**Mattison W-455 Wide Belt Grinding and Polishing Machine.**



**Mattison J-135 Idler Stand and Pulley adapts regular polishing jack to the use of factory-coated abrasive belts.**



**Mattison H-424 Internal Tube Grinding and Polishing Machine for finishing inside of metal tubes.**

**MATTISON MACHINE WORKS - ROCKFORD, ILLINOIS**

WOMEN OPERATORS SAY

*"Thumbs Up!"\**

TO THE NEW *Thor*  
**"ARMORED IN PLASTIC"**  
1/4" ELECTRIC DRILLS

The "thumbs up" grip that women generally use in operating the new Thor "Armored in Plastic" drill also expresses the way they feel about this remarkable new tool—they like it!

**They like its 14% less weight!** With housings of light but sturdy "Thorite" plastic, these heavy duty portable electric drills weigh fully 14% less than previous types. That means less fatigue and greater productivity.

**They like its new handling ease!** The perfect balance and trim lines of the new Thor drills, plus the "kind" feel of the plastic housing itself, provide handling ease never before possible.

**They like its cooler operation!** The new Thor "plastic" drills run cooler for two reasons. The

\*Studies show that the natural grip of most women operating a small drill is the "thumbs up" one pictured here. The handle of THOR's "plastic" drill is especially designed to make the most of this trait.

plastic "Armor" is a non-conductor of heat. The oversize Thor fan and ample intake and exhaust slots circulate generous amounts of cooling air through the machine.

**They like its greater power!** The new Thor "Plastic" drills, powered by the famous Thor high torque, over-capacity motor, develop more power per pound.

**You, too, will like** the way these new Thor "Armored in Plastic" portable electric 1/4" drills point the way to top speed production. If yours is a war industry, Thor's quantity output will enable you to get them quickly! Ask for full details.

*"Tools are weapons—start 'em right."*

*Thor*

Portable Pneumatic and Electric Tools

INDEPENDENT PNEUMATIC TOOL COMPANY

828 W. JACKSON BOULEVARD, CHICAGO, ILL.  
Branches in Principal Cities

# More production per worker!



## FOOT CONTROL LEAVES BOTH HANDS FREE TO WORK!

**Features:** Vise opens and closes instantly... Remains open or closed without constant foot pressure... Exerts grip of 15 times air-line pressure... Measures 12 x 6½ x 6 in.... Jaw width 3 in.... Jaw depth 2 in.... Maximum opening 3 in.... Maximum travel ½ in. Attaches to air line or individual compressor.

**SPEEDY AIR VISE**  
complete with Foot Control  
Valve, Air Hose and Fittings...

**\$24**

Want more production? Follow the example of leading war plants — put *Speedy Air Vises* to work! This foot-controlled, pneumatic vise leaves operator's both hands free for safe, fast insertion and removal of work. You'll find it cuts time, labor and costs, reduces fatigue. Sturdy, compact, precision-built... so low in price it can be economically used on every drill-press, miller, filer and assembly line. Prompt delivery. Ask your distributor or write for details.

**W. R. BROWN CORP. 5725 ARMITAGE AVE. CHICAGO, ILL.**

**AMERICA'S MOST TALKED-ABOUT VISE AT A PRICE!**



## Spotter for undersea raiders...

SEA LIONS beat their cousins, the seals, out of an important job during the early part of World War I. Both have a hoarse, barking voice. But sea lions have sensitive, external ears... seals do not.

So sea lions got the job of detecting U-boats. They were trained to bark like fury whenever they heard the vibrations of an approaching undersea raider.

Today, there are many devices for detecting the approach of submarines, but none of them depends on animals. All either depend on machines, or they are constructed with the help of machines.

The heavy responsibility of these machines is illustrated by the fact that during the last war, German U-boats destroyed 5,408 vessels, or 11,189,000 gross

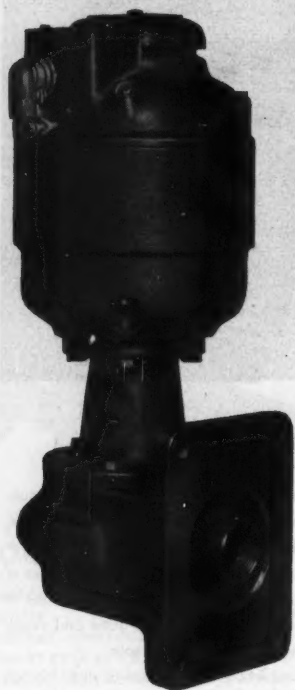
tons of shipping. Today, Germany is building 20 submarines a month, each of which can potentially sink, on a single raiding trip, as many as 14 ships!

But this is only one of the wartime responsibilities of the machine tool industry. Our nation's production of airplanes, tanks, jeeps, anti-aircraft guns and munitions—all this stems from machine tools.

In wartime production, when speed is vital, the output of Cone Multiple Spindle Automatic Lathes is of especial importance. These machines can, in many operations, increase the production range as much as 10 times, depending on the character of the work. This is one of the reasons why the machine tool industry will continue to make a vital contribution to our victory in war.

**CONE Automatic Machine Company, Inc., Windsor, Vermont**

# HIGH FLUSHING CAPACITY



Model 11020-A

## with **GUSHER** COOLANT PUMPS

And yet, you can cut down the flow to a mere dribble without building pressure.

Gusher Coolant Pumps are being used by leaders in the industry for grinding, honing, cutting, milling, tapping and threading.

Learn the exclusive advantages of Gusher Coolant Pumps. Sizes and types from 1/10 to 2 h.p.

**Write for data and  
specifications.**


**THE RUTHMAN MACHINERY CO.**

1817 READING ROAD CINCINNATI, OHIO

**LARGEST EXCLUSIVE BUILDERS OF COOLANT PUMPS**

# *Tannewitz* VARIABLE SPEED BAND SAWS

*Are*  
**Metal-Cutting/  
EXPEDITERS!**

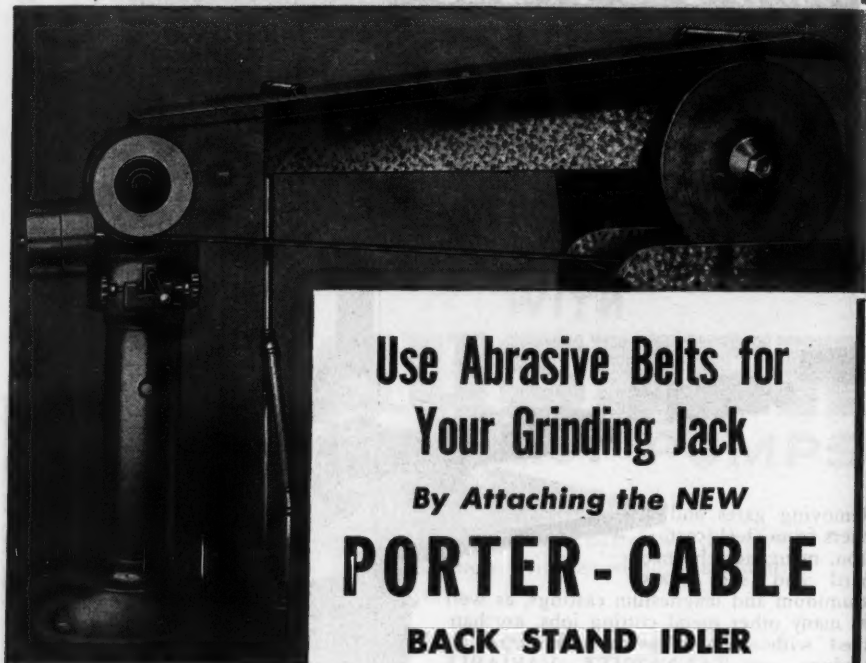


Removing gates and risers from steel, cast iron, manganese bronze, hard and soft brass, aluminum and magnesium castings, as well as many other metal cutting jobs, are handled with great dispatch and surprising savings on TANNEWITZ VARIABLE SPEED BAND SAWS. And since they are available in any 3:1 speed ratio from 100:300 to 1000:3000 blade feet per minute, with instant adjustment to intermediate speeds, one machine serves ideally for cutting a variety of materials. Made with 30," 36" and 42" wheels.

Other models (single speed) for such purposes as sawing large blocks of aluminum and magnesium, cutting large steel templates, etc., are available in capacities and speeds to ideally accommodate work of practically any size or character. For complete facts write for bulletin on Variable Speed Band Saws. Also on request bulletins on: Sheet Metal Cutting Band Saws; DI-SAWS, combination band saws for sawing, filing and polishing.

**THE TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN**

**NOW! Smoother, More Uniform,  
Longer Sustained Cutting!**



**Use Abrasive Belts for  
Your Grinding Jack  
By Attaching the NEW  
PORTER-CABLE  
BACK STAND IDLER**

★ Let an abrasive belt take the place of the grinding wheel, and get cleaner, faster cutting. Different grit belts can be quickly installed for different jobs. Wear is slow and even—true cutting surface is maintained.

★ A wheel with just enough resiliency to provide no-slip grip for driving the belt replaces the regular wheel on the jack spindle. This resiliency eases the contact with the work, prevents "bounce-off," insures a smoother cut. Cooler running of belt and the resulting sharpness of the grits, maintain grinding ability at high efficiency.

★ The Back Stand Pulley, fitted with counterweight for tension, keeps the belt constantly taut and true-faced. No more nursing partly worn wheels. No more dressing down. Saves in over-all cost, too.

*Write for illustrated bulletin or call your Porter-Cable  
representative—his name is in the phone book.*

**PORTER-CABLE MACHINE COMPANY**  
300-9 Wolf St., Syracuse, N. Y.



**TOOLS THAT  
• CUT FASTER  
• LAST LONGER**

High-Speed End Mills •  
Continuous Pilot Count-  
erbore • Spiral Fluted  
Chucking Reamers



**PUTNAM HI-SPEED**  
*Continuous Pilot*  
**COUNTERBORES**

Counterbores that provide exceptional tool economy! Almost the entire tool can be utilized as the pilot extends without interruption through the entire fluted portion. As the cutter flutes are ground back due to wear, the pilot head can be cut off to any desired length. A perfect pilot head is always exposed. With effortless feeding, Putnam Continuous-Pilot Counterbores cut rapidly, smoothly and accurately . . . producing long spiralling chips rather than small metal particles. Write for full details.



**PUTNAM TOOL COMPANY**

2981 Charlevoix Ave.

Detroit 7, Michigan



*... it's got to be right!*

★ ★ ★ THERE'S no time to be lost because of rejected parts. A delay may lose a life, or a battle. Chance cannot be taken where safety depends upon the precision of mating threads.....That's why manufacturers of parts and engines for every fighting plane, every bomber, on our far flung battle fronts use Bakewell Precision Tapping Machines. The exclusive leading-on mechanism of the Bakewell assures even a Class 5 thread fit in any material, with one pass, without rejects. The Bakewell lead screw hobs its own pitch onto electrically operated brass guide fingers which engage the lead screw as the tap cuts. Play and backlash are eliminated. Sizes of holes tapped in any material are governed according to tap pitch diameter. Time, labor, materials are saved .....The war doesn't have to wait for Bakewell tapped holes.



**BAKEWELL MODELS**

No. 0—0-80 to 10/24

No. 1—8/32 to 7/8

No. 1R—Radial

No. 2—3/8 to 2 1/2

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**BAKEWELL**

*Manufacturing Co.*

2009 SANTA FE AVE., 21 • LOS ANGELES, CALIF.

# DESIGNED TO SPEED PRODUCTION

As industry rewards employees who suggest ideas that speed production, so do "Yankee" Fine Mechanics' Tools reward industry by saving time and energy on countless jobs. From Spiral Screw Drivers to Tap Wrenches and from Automatic Drills to Bit Braces, each "Yankee" Tool has been painstakingly *designed* to get things done. Ingenious and dependable, "Yankee" Tools have contributed to the efficiency of American production for nearly half a century. Today, of course, they've gone to war, and even our all-out effort cannot meet every wartime demand. Order from your supply house, or write North Bros. Mfg. Co., Dept. AV-943, Phila., Pa. Furnish priority ratings whenever possible, and every effort will be made to fill your orders.

"YANKEE" Spiral Screw Driver No. 130A. A Size for Every Purpose



## "YANKEE" TOOLS

*make good mechanics better*

North Bros. Mfg. Co., Phila. 33, U. S. A.

Established 1880

INSTEAD OF FORMER

**\$7.83**  
**.78**

TO PUNCH ONE PIECE COSTS

**A STORY OF  
SHORT RUN  
PIERCING  
ECONOMY**

on a **WIEDEMANN TYPE R-7 TURRET PUNCH PRESS** with **GAUGE TABLE**

**A PER PIECE** **\$7.05**  
**SAVING OF**

### THE JOB

Pierce one panel: .125" x 37 $\frac{3}{4}$ " x 53 $\frac{3}{4}$ " mild steel  
14 Different Dies — 108 Different Holes Pierced  
TOTAL TIME FOR ONE PIECE — 40.11 min.

(one operator required)

FORMER TIME — Old Equipment — 6 $\frac{1}{2}$  hrs.  
(2 operators required)

The Wiedemann Turret Punch Press is the only truly economical method of short-run production for any sheet metal or plate shop in the aircraft, electrical, electronic, industrial sheet metal, radio, and shipbuilding industries. It is ideal equipment for production, experimental and laboratory piercing of sheets or plates.

Type R-7 shown (on which example was produced) exerts a pressure of 160,000 lbs. 24 to 32 stations with 54" throat depth. Only one operator required for any job. Layout and piercing is performed in same operation — all layout readings are taken from blueprint or chart — and are immediately positioned on gauge table and work is pierced.

Get the facts — Write today for new bulletin about the Wiedemann Economy Piercing Method.

**WIEDEMANN MACHINE CO.**  
1821 Sedgley Ave. Philadelphia, Pa.

### LEVER TYPE R-2 OPERATED PUNCH PRESS FOR EVERY METAL WORKING SHOP

Replace drilling operations and punching with hand tools. Eliminate changing of punches and dies. R-2 punches smaller die

holes in mild steel up to  $\frac{1}{4}$ " clean enough to be tapped. No distortion even up to full capacity of 15,000 lbs. All punches equipped with centers. As good for experimental work as for production small run piercing. Write for details on R-2 — the time and money saver for every shop.

**WIEDEMANN TURRET PUNCH PRESSES & GAUGE TABLES**

## Just Put Chuck on Machine and Start Work

**.....No  
AUXILIARY  
EQUIPMENT**

*is needed with*

**PERMANENT**

**MAGNET TYPE**

**MAGNETIC  
CHUCKS**

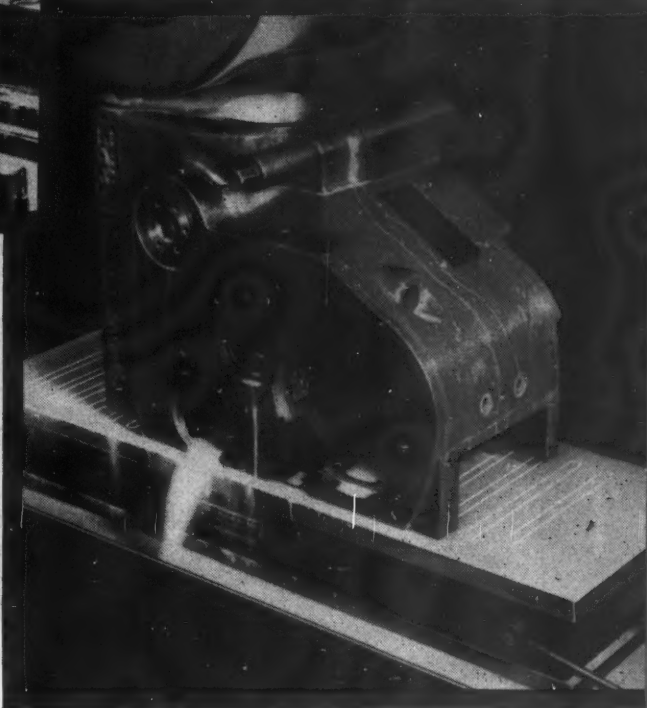
**—because Permanent  
Magnets Provide  
the Holding Power**

No complicated installations are required when you use Brown & Sharpe Magnetic Chucks of the Permanent Magnet Type. No special preparations are necessary — no wiring — no auxiliary current supply or generators. Simply place the chuck on the machine where it is to be used and commence work. Small sizes are transferred easily from machine to bench for hand operations.

Perhaps Brown & Sharpe Magnetic Chucks would help you in maintaining your production quotas in the armament program. Or their efficiency and simplicity of operation might aid in a saving of manpower. Complete range of sizes for all ordinary requirements. Magnetic chuck catalog sent on request. Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

**NO WIRES—NO HEATING—NO OPERATING COSTS**

*For sale only in the U. S. A. and its Territories and in Canada.*



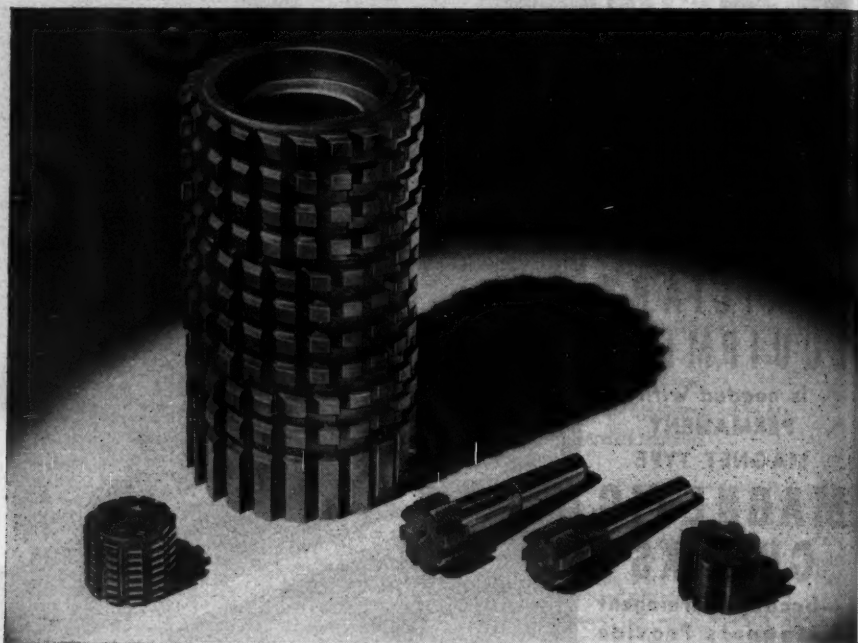
UPPER, 9" Rotary Model No. 9R holding work for light turning in lathes. This chuck, while especially suited for grinding operations, can be used for other light machine work.

LOWER, Rectangular Model No. 1236. This 12" x 36" chuck, the largest stock size in the line, is suited for large work or for groups of duplicate parts.



# BROWN & SHARPE

# PLAN-O-MILL



## THREAD MILLING CUTTERS

Years of on-the-job experience—working with production men all over the country as each Plan-O-Mill milling machine was tooled for another job—told Plan-O-Mill engineers exactly what was needed for accurate, economical thread milling.

*The result is the Plan-O-Mill Multiple Thread Milling Cutter, now proving its worth in factories and machine shops from coast to coast.*

Plan-O-Mill Thread milling cutters are available ground or unground with straight or spiral flutes, in National, Whitworth, Acme, V, and special forms, for use on all types of thread milling machines. For speedy delivery give full details when ordering, including size of cutter; thread form, pitch, and direction; straight or spiral gash, and job description.



**PLAN-O-MILL CORPORATION, 1511 E. Eight Mile Road, Hazel Park, Mich.**

# STARRETT TOOLS

## **—the tools to finish the job!**

Starrett standards of accuracy and workmanship must be maintained in order that Starrett Tools may contribute the essential speed, precision and confidence to skilled and loyal hands. . . . We must likewise do our utmost to get these tools into those hands that count most heavily toward the successful conclusion of the one big job. . . . To that end your mill supply distributor is performing an invaluable service. You can continue to rely on him for efficient, dependable assistance on all matters of precision tool procurement.



**THE L. S. STARRETT CO. • ATHOL • MASSACHUSETTS • U. S. A.**

*World's Greatest Toolmakers*

# STARRETT

**PRECISION TOOLS • DIAL INDICATORS • GROUND FLAT STOCK  
HACKSAWS • METAL CUTTING BANDSAWS • STEEL TAPES**



**ECONOMY GRINDING LUBRICANTS** are speeding production in countless industries. Here in the Jack & Heintz plant, the water-soluble type is helping speed bore and depth grinding.

**ECONOMY GRINDING LUBRICANTS** are being used successfully in the grinding of critical component parts of internal combustion motors for aircraft, automobiles, trucks and tractors...air-compressor parts, steam turbines, centrifuges, and countless mechanical units where a moving assembly member must possess high load-carrying capacity without disturbance to the load-carrying surface.

*New catalog E-16 well worth having.*

*Yours for the asking.*

**THE WHITE & BAGLEY COMPANY**

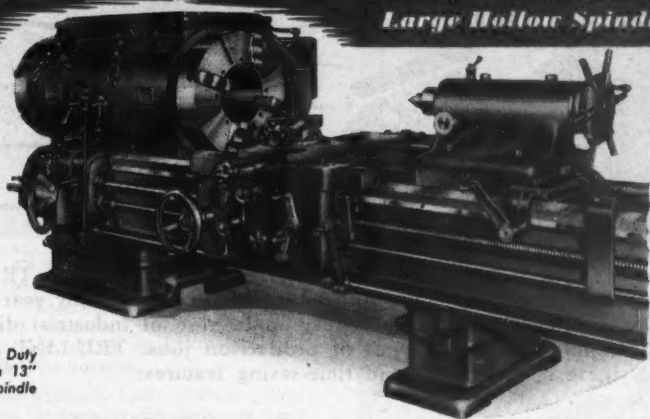
WORCESTER, MASS., Chicago, Detroit, Minneapolis



# HYDRATROL

Wide Range of Sizes Provide Efficient Application to a Wide Range of Work!

*Large Hollow Spindle Type*



30" Heavy Duty  
Lathe with 13"  
Hole in Spindle

**Complete Line of Sizes from 18" to 36" . . .**



18" Lathe with  
7 1/4" Hole in Spindle

**SMALL—18" . . . . . Up to 7 1/4" Hole**  
**MEDIUM—24" . . . . . Up to 12" Hole**  
**LARGE—27" . . . . . Up to 13" Hole**  
**LARGE—30" . . . . . Up to 14" Hole**  
**LARGE—36" . . . . . Up to 16 1/4" Hole**

## **8 Distinctive Features**

- Easy, Fast, Simple Operation.
- Hydraulic Brakes and Clutches.
- Absence of Mechanical Troubles.
- Essential Operating Information Automatically Presented (on all Standard Models).
- Automatic and Ample Lubrication.
- Mechanism Protected by Automatic Control.
- Extraordinary Hardness of Bed.
- Available with Large Turrets for carriage which fully utilize the Great Power Capacity of these machines; and with Beds on both ends of Headstock.

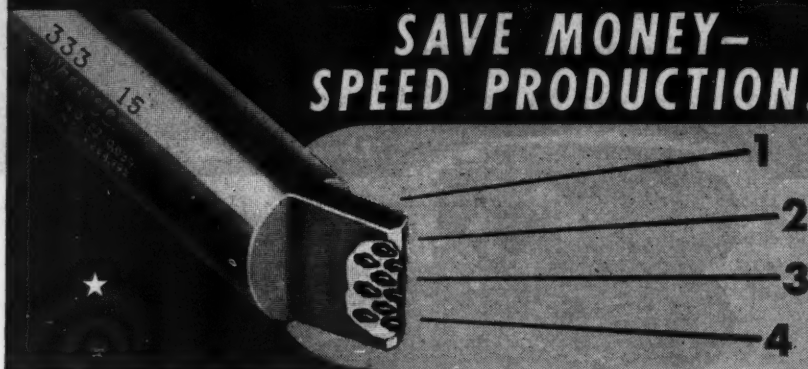
**Lehmann MACHINE COMPANY**

CHOUTEAU AT GRAND • SAINT LOUIS (3) MISSOURI

*Here's Why*

## TRU-LINE DIAMOND TOOLS

### SAVE MONEY— SPEED PRODUCTION!

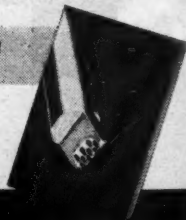


Designed for straight, profile and step dressing operations, TRU-LINE TOOLS are engineered to the job by craftsmen whose many years of experience have taught them the proper application of industrial diamonds and diamond tools to all types of production jobs. TRU-LINE TOOLS embody these money-saving and time-saving features:

- 1 NO TURNING**—diamonds contact wheel at right angles to wheel axis. . . no turning of tool necessary . . . patented blade does not glaze, is always free cutting.
- 2 OVERLAPPING ROWS**—diamonds contacting wheel cut in same line . . . rows overlap—as one row is used another row is in cutting position . . . a continuous cutting surface is thus obtained.
- 3 THIN BLADE**—dissipates heat rapidly . . . diamonds held securely by chemical reaction between diamonds and patented matrix alloy until entirely used up.
- 4 SELECTED DIAMONDS**—the machine, wheel grain texture, wheel hardness and characteristics of piece to be worked are considered in selecting diamonds for TRU-LINE TOOLS . . . smaller diamonds cut tool costs materially.

★ **SEND FOR THIS FREE BOOK TODAY!**

Learn of the many other money-saving and time-saving features of TRU-LINE TOOLS. This new book gives complete details with prices. Send for it today!



# WHEEL TRUEING

3200 W. DAVISON

# TOOL COMPANY INCORPORATED

DETROIT 6, MICH.

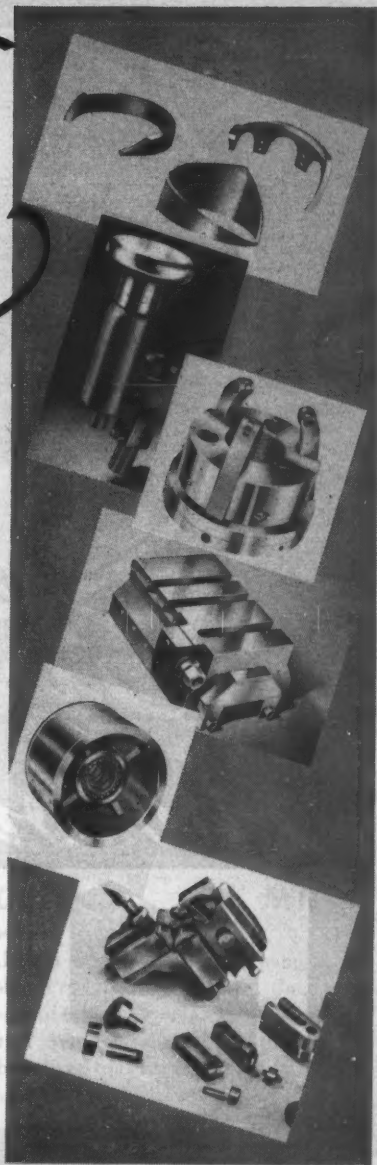
# "MODERN COLLET Can Supply That SCREW MACHINE PART"



**R**EGARDLESS of what screw machine part you may require, Modern Collet can supply it. Of particular importance to you, many of these parts are standard "catalog items" . . . incorporating exclusive and advanced design features . . . and manufactured to specifications which usually excel those of the parts they replace.

As a specific example, a part which is typical of Modern Products is the patented feed change handle shown as the second item in the illustration at the right. Specifically intended for Gridley Automatics, it is so designed that the feed gears can be adjusted to mesh properly regardless of a worn condition of either gears or change levers. This eliminates much gear noise and rattle and reduces wear on all parts of the power feed mechanism.

In our screw machine rebuilding work—a specialized service also available to you—we have endeavored constantly to develop, produce and install parts which will contribute to "better than new performance" of the machines. The same parts are supplied to you for individual replacement purposes . . . to modernize and increase the efficiency of any of your screw machines. Complete information on the parts illustrated and many others is contained in our catalog—yours for the asking.



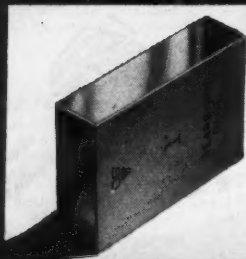
## MODERN COLLET and MACHINE CO.

401 Salliotte Street

Ecorse, Michigan



# Strictly a Thoroughbred



● Three generations behind each and every Dearborn Gage Company Standard. In the "drive to the wire" breeding tells; that is why today at the finish line in the plants of the precision manufacturers throughout the country you find chromium plated gage blocks by Dearborn.



**DEARBORN GAGE COMPANY**

*Originators of Chromium Plated Gage Blocks*

22032 BEECH STREET

DEARBORN, MICH.

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ACME  
AND TA

## IN AMERICA'S GREAT PRODUCTION PLANTS..



In Stewart-Warner plants, Acme-Gridley Automatics are now turning out precision parts for fighting tools. When peace comes, many of the same machines will produce new and improved radios, household appliances and automobile equipment.

### PRECISION...IN "TENTHS"

### PRODUCTION...IN MILLIONS

There is the reason why America's war production is giving our men the best of fighting equipment—and doing it *fast*.

Acme-Gridley automatics are today turning out millions of parts for guns, planes, tanks and ammunition—with dimensions measured in tenths of thousandths—each

part accurate and interchangeable.

Production goes on at the highest speeds and fastest feeds modern tools will withstand.

Acme-Gridley automatics will be ready to deliver that same kind of fast, accurate production for peace—at lower costs than we have ever before known.

# THE NATIONAL ACME

170 EAST 131<sup>ST</sup> STREET • CLEVELAND, OHIO

ACME-GRIDLEY 4 & 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • THE CHRONOLOG • LIMIT AND CONTROL STATION SWITCHES • SOLENOIDS • CENTRIFUGES • CONTRACT MANUFACTURING

# DETROIT DIE SETS ★

SEMI-STEEL  
and ALL-STEEL  
STANDARD DIE SETS

SPECIAL DIE SETS

PRECISION DIE SETS

DOWEL PINS

SPRINGS

ACCESSORIES

## HEADQUARTERS FOR SPECIAL DIE SETS

Come to headquarters for your special die set requirements.

We are especially well equipped and qualified to make special die sets to your specifications and we spare no effort to give you prompt service.

*Send us your prints and instructions. Your inquiries will be answered by return mail.*

**STEEL PLATE** — fabricated and machined to your specifications.

**Send for catalog.**



## DETROIT DIE SET CORP.

2895 W. GRAND BLVD., DETROIT 2, MICHIGAN

Sales and Service Offices in — NEW YORK • BUFFALO  
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equipm  
KRW  
for Wa  
ready  
usual p  
engine  
draulic  
capacit  
1 and 3

# PAN AMERICAN USES KRW EQUIPMENT TO



*"Keep 'em  
Flying"*

Illustration at left shows a KRW  
3-ton Bench Type Arbor Press  
in use in Pan American shops.

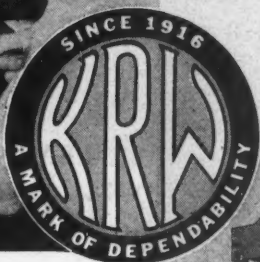
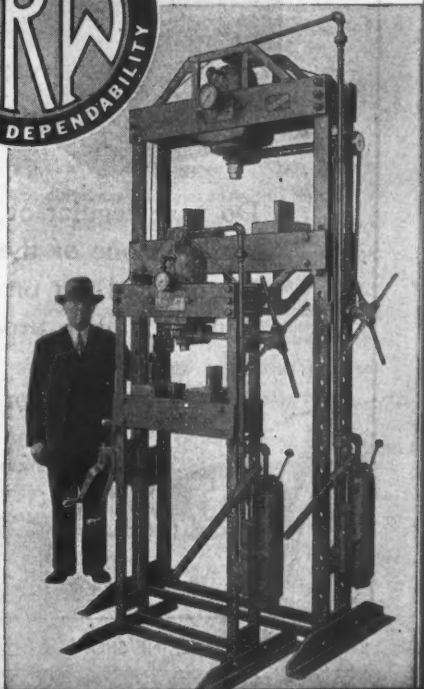


Illustration below shows a special  
extra high 75-ton KRW  
Hydraulic Arbor Press in  
comparison with the standard  
25-ton unit.

● Girdling the globe as it does, and with every Clipper serving some phase of the war effort, Pan American insists on the best possible equipment in its shops—to speed overhaul and increase the number of trips per plane per month. That you find them using KRW Arbor Presses and other equipment is further proof of this policy.

KRW Hydraulic Arbor Presses are Engineered for War Production. Hundreds of them have already been speedily adapted to handle many unusual production jobs—without time-consuming engineering delays. KRW builds standard Hydraulic Arbor Presses in 25, 50, 60 and 75-ton capacities and Bench Type Arbor Presses in 1/2, 1 and 3-ton capacities.

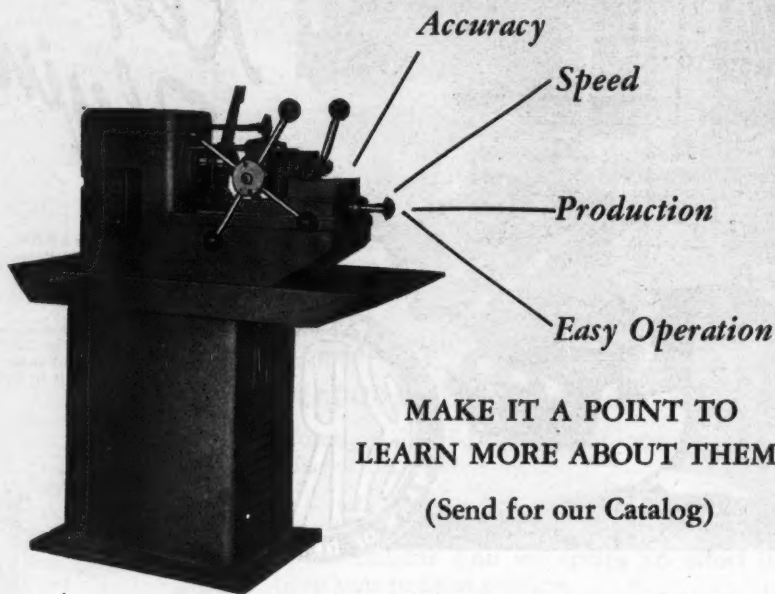


## K. R. WILSON

10 LOCK ST. BUFFALO 2, N. Y.

## 4 POINTS--- (NOT RATIONED)

TO CONSIDER ABOUT  
GEOMETRIC PRECISION THREADING MACHINES



MAKE IT A POINT TO  
LEARN MORE ABOUT THEM.

(Send for our Catalog)

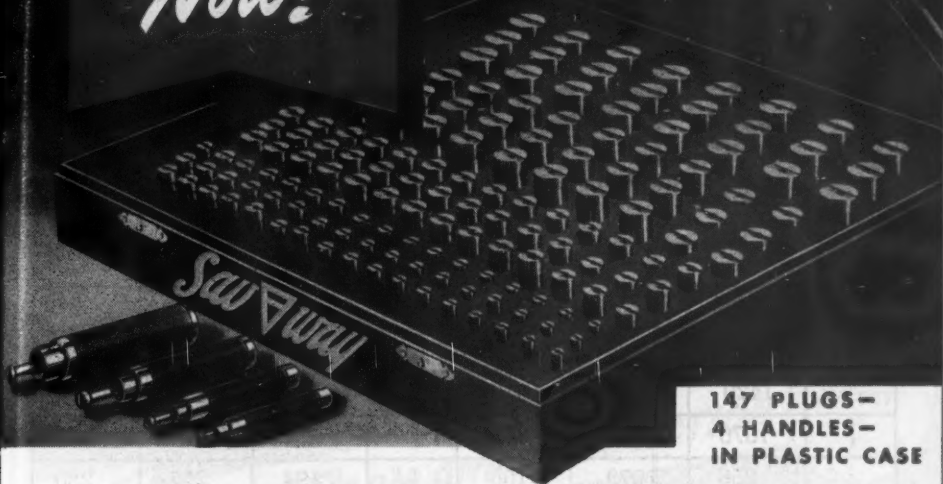
Do your regular or second operation threading work on one of these machines, after the parts are blanked out on your automatics, and maintain maximum production. That's the point!

*Prompt Deliveries Too!*



THE GEOMETRIC TOOL COMPANY,  
NEW HAVEN 15, CONN.

*Reserve  
Your Set  
Now!*



**147 PLUGS—  
4 HANDLES—  
IN PLASTIC CASE**

## Complete Master Set of Standard Plug Gages

For the first time—a complete Master Set of standard plug gages for hole inspection, including 147 plugs and 4 handles. Plugs are set in increments of 1/64ths, starting at 1/4" and going to 1". There are three plugs of each nominal size—.0005 over, standard, and .0005 under.

All plugs are deep-frozen before finish grinding to relieve internal strain and pro-

vide accelerated aging, and are held to gage makers' (X) tolerance, lap finish.

The plastic case has a transparent cover which presents a clear view of the contents and instantly indicates a missing plug.

Sav-Way Plug Gages are produced by skilled gage makers; they have been proven in actual use on aircraft and ordnance parts of the highest accuracy.



KEEP AN EYE ON

Send Coupon for Detailed  
Description and Price

**Sav-Way INDUSTRIES**  
\* Machine Tool Division \*  
4875 EAST EIGHT MILE - DETROIT, MICHIGAN

PRODUCERS OF SAV-WAY HAND AND HYDRAULIC INTERNAL GRINDERS • SAV-WAY GOLD SEAL SPINDLES • PLUG GAGES • PRECISION AIRCRAFT AND AUTOMOTIVE PARTS

SAV-WAY INDUSTRIES  
Box 117, Harper Station, Detroit 13, Michigan  
Please send descriptive literature covering Sav-Way plug gages.

Name \_\_\_\_\_  
Position \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

# 1918 WELDON 1943



## REMINDERS

| Diameter of End Mill | Tool Steel<br>70 ft. per Min.<br>R. P. M. | Machine Steel<br>80 ft. per Min.<br>R. P. M. | Cast Iron<br>90 ft. per Min.<br>R. P. M. | Diameter of End Mill   | Tool Steel<br>70 ft. per Min.<br>R. P. M. | Machine Steel<br>80 ft. per Min.<br>R. P. M. | Cast Iron<br>90 ft. per Min.<br>R. P. M. |
|----------------------|---|--|--|--|---|--|--|
| $\frac{1}{16}$ "     | 4276                                      | 4888   | 5498                                     | $\frac{7}{8}$ "  | 306                                       | 349  | 393                                      |
| $\frac{3}{32}$ "     | 2855                                      | 3259   | 3688                                     | $\frac{1}{8}$ "  | 285                                       | 326  | 366                                      |
| $\frac{1}{8}$ "      | 2140                                      | 2440   | 2750                                     | 1"   | 267                                       | 306  | 344                                      |
| $\frac{3}{16}$ "     | 1420                                      | 1625   | 1830                                     | $1\frac{1}{8}$ "   | 238                                       | 272  | 306                                      |
| $\frac{1}{4}$ "      | 1070                                      | 1222   | 1375                                     | $1\frac{1}{4}$ "   | 214                                       | 244  | 275                                      |
| $\frac{5}{16}$ "     | 856                                       | 978  | 1100                                     | $1\frac{3}{8}$ "   | 194                                       | 222  | 250                                      |
| $\frac{3}{8}$ "      | 713                                       | 815  | 917                                      | $1\frac{1}{2}$ "   | 178                                       | 204  | 229                                      |
| $\frac{7}{16}$ "     | 611                                       | 698  | 786                                      | $1\frac{5}{8}$ "   | 165                                       | 188  | 212                                      |
| $\frac{1}{2}$ "      | 535                                       | 611  | 688                                      | $1\frac{3}{4}$ "   | 153                                       | 175  | 196                                      |
| $\frac{9}{16}$ "     | 475                                       | 543  | 611                                      | $1\frac{7}{8}$ "   | 143                                       | 163  | 184                                      |
| $\frac{5}{8}$ "      | 428                                       | 489  | 550                                      | 2"   | 134                                       | 153  | 172                                      |
| $\frac{11}{16}$ "    | 389                                       | 444  | 500                                      | • For Shop and Instructional Use the<br>above Data is Available as a Two-<br>Color Wall Chart.<br><i>Send for your copy today.</i> |   |  |  |
| $\frac{3}{4}$ "      | 357                                       | 407  | 458                                      |  |   |  |  |
| $\frac{13}{16}$ "    | 332                                       | 379  | 427                                      |  |   |  |  |

### THE WELDON TOOL CO.

*Cleveland,  
Ohio*



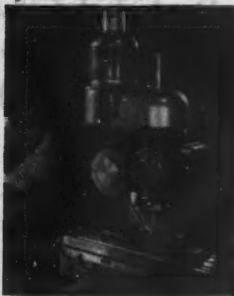
3000 WOODHILL ROAD

# DOUGLAS *Precision* MACHINES



The Douglas Miller combines rigid, well balanced design with convenience of control making it particularly suitable for accurate work in tool room as well as for general production. It is available in plain or universal type.

Showing operation with Universal Milling attachment on tool room job producing a production fixture.



Showing operation with four cutters machining alloy steel for high precision aircraft parts

**FOR TOOL ROOM AND PRODUCTION**

Prompt  
Delivery  
to  
War Plants

The Rotorex Universal Tool and Cutter Grinder will accurately perform all kinds of tool grinding operations. Readily interchangeable attachments are available to set up machine for single-purpose jobs such as cylindrical, internal and radius grinding.

Operation showing set-up for internal grinding.



Operation showing set-up for sharpening straight gash hobs.



**DOUGLAS MACHINERY CO., Inc.**

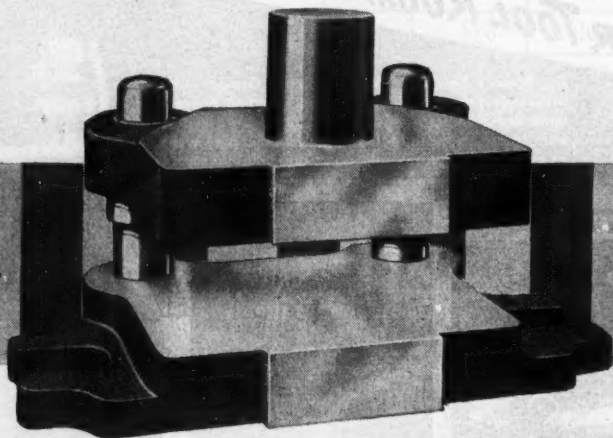
150 BROADWAY

NEW YORK, N. Y.

# PRODUCTO DIE SETS

To help speed up production of tools for war production in all parts of the Country, Producto Die Sets are available for shipment from our two factories mentioned below. Also, Die Supply Company, 4747 Hough Avenue, Cleveland, Ohio.

Pacific Coast users will find stock of Die Sets and Accessories at Jamison Steel Corporation, San Francisco and Los Angeles. Our No. 9 Die Set Catalog gives complete engineering information on Die Sets and Die Makers' Accessories.



## THE PRODUCTO MACHINE COMPANY

940 HOUSATONIC AVE., BRIDGEPORT, CONN.

3017 MEDBURY, DETROIT, MICH.

# 12" Hy-Draulic SLOTTER

**GIVES YOU ACCURACY,  
SPEED and POWER  
FOR VICTORY!**

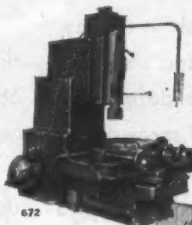
For victory over tough war-time production jobs the 12" Hy-Draulic Slotter gives you ample accuracy for the finest commercial work. It gives you centralized controls, every convenience for quick set-up and easy operation.

Hydraulic ram-drive and hydraulic feeds of 12" Hy-Draulic Slotter give you, quickly, the exact combination of cutting speed and feed to get out maximum production on wide variety of jobs you can put on the machine.

Here is a big, powerful machine that has 12" stroke, works to center of circle 48" diameter, weighs 12,500 pounds. It has the brawn to do tough jobs, and the "beef" to keep on doing them 3 shifts. When your victories in the battle for production have helped our armed forces to win the war, your 12" Hy-Draulic Slotters will be right there to carry on peace-time tool and die work, manufacturing operations and maintenance jobs that will help create better living for all, at lower cost. The 12" Hy-Draulic Slotter has what it takes. Write now for details.



◆ The 12" Hy-Draulic Slotter, showing angular adjustment of ram, convenient centralized controls, means for infinite adjustment of cutting speeds and feeds in specified ranges, means for easy setting of ram-stroke and for independently reversing it at any point.



◆ The 12" Hy-Draulic Slotter, showing main driving motor; coolant pump with vertical direct-connected motor; duplicate lever for ram-movement control. Note handwheel for transverse movement, index pin, built-in dividing head, and hand-wheel for longitudinal movement.

Folder shown contains detailed description, illustrations and specifications. Write for your copy today. Ask for Bulletin 1601.

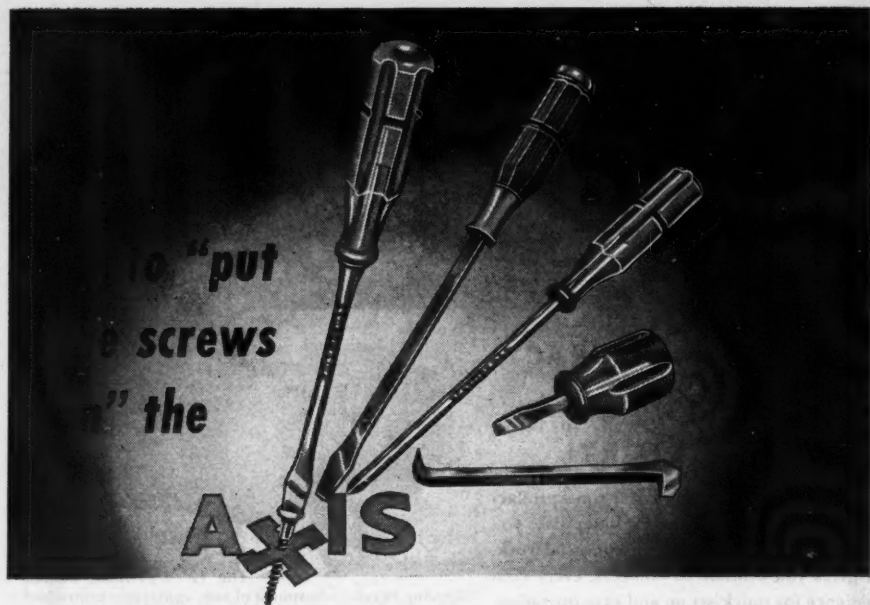


4314



Shapers. Planers. Slotters. Shaper-Planers.  
**ROCKFORD MACHINE TOOL CO.**

ROCKFORD, ILLINOIS, U.S.A.



## ... professional mechanics choose Plomb Tools

Throughout war industries today, Plomb tools of all kinds and sizes are helping build weapons to defeat the enemy. From the familiar screwdriver to intricate socket and attachment sets, outstanding performance and dependability have made them the choice of experts for better, safer, longer-lasting service.

These famous tools are available through the Plomb dealer in your community. Call him for the tools you need on your war job.

Remember Plomb offers you a double service—consult the Plomb Tools Contracting Company Division for special tools; call your local Plomb dealer for regular ones.

# ▽ PLOMB ▽

Fine Hand Tools  for All Industries

PLOMB TOOL  
COMPANY



LOS ANGELES  
CALIFORNIA

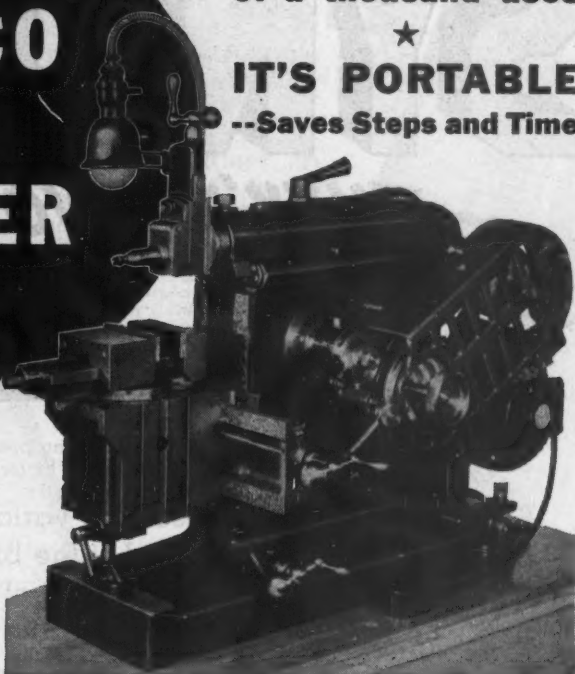
# SPEED-UP WAR PRODUCTION JOBS

with this  
precision machine  
of a thousand uses



**IT'S PORTABLE**  
--Saves Steps and Time

## AMMCO 7" SHAPER



### Just wheel up to bench -- plug in -- go to work !

On jobs requiring a stroke of 7" or less, the AMMCO 7" PRECISION SHAPER will enable you to save a lot of time and expense in a set-up which would be required for larger shapers. Furthermore, the AMMCO will enable you to get away from the cost of operating a big shaper on small work.

Portable Cabinet, as shown above at left, available as optional equipment, enables this shaper to be moved about the shop. It can be rolled from one job to another, and can be brought right up to machine or bench where man is working...Write today for specifications and prices.



**AUTOMOTIVE MAINTENANCE MACHINERY CO.**  
2100 Commonwealth Ave. — North Chicago, Illinois, U. S. A.

**Production Problem ?**

*Call*

# SYNCRO

**- THEY'LL KNOW !**



*At present SYNCRO is furnishing precision parts for these Weapons of Victory.*

SYNCRO specializes in solving various engineering and production problems. Let the broad, up-to-the-minute experience and ingenuity of SYNCRO engineers help you now — and after the war.

## SYNCRO DEVICES *inc.*

3265 Bermuda Ave., Dept. MM-93, Ferndale 20, Michigan



**MANUFACTURERS OF PRECISION MACHINE TOOL PRODUCTS**

# Grobet

## ROTARY FILES

Victory deserves only the best. GROBET products have earned a reputation as precision-made, first quality tools since the very beginning of the machine age. When you use GROBET ROTARY FILES you can be sure that they will do their jobs better, and stay sharp longer.

*There is a GROBET ROTARY FILE for your particular needs. Send for Catalog KR illustrating in full size, hundreds of Hand Cut, Mill Cut, Ground Cut Rotary Files; also Diesinkers Burs, Tube Burring Cutters, Countersinks, etc. It's the most complete of its kind.*

### GROBET FILE CO. of AMERICA

421 Canal Street



New York, N. Y.

IMPORTERS OF GROBET SWISS FILES

MFRS. OF GROBET ROTARY FILES

September, 1943

MODERN MACHINE SHOP

93

**"38 HOURS  
OF CONTINUOUS  
GRINDING!"**



**THAT'S THE RECORD SET BY A  
MID-WEST "B" BOND GRINDING WHEEL  
OF THE TYPE PICTURED HERE**



The "38 hour" wheel is a MID-WEST "B" BOND WHEEL, Type 5, 7.80, JB5, sized 10 x 2 x 2 and recessed on one side. It was installed on an Ex-Cell-O dry grinder by a large munitions plant in New Jersey and was being used to sharpen cemented carbide tool tips.

In a report submitted to the MID-WEST ABRASIVE COMPANY, engi-

neers of the New Jersey plant said:

*"This wheel lasted for 38 hours of continuous grinding. Best wheel ever used on this job. The wheel held its shape and required considerably less dressing."*

For faster, more efficient carbide tool grinding order MID-WEST "B" Bond wheels today!

**MID-WEST ABRASIVE COMPANY**

Manufacturers of DEPENDABLE Abrasives

1960 E. MILWAUKEE AVENUE

DETROIT 11, MICH.

*Again Apex helps the users of Phillips Screws!*



**A**PEX announces a series of bit holders that revolutionizes the use of Power Bits and Hand Drivers for Phillips Recessed Head Screws. Here's what they do:

*One* Save you money after original installation of holders is made because they eliminate necessity of carrying so many different sizes of screw driver bits. Only item necessary to carry in stock is the insert tips. One range of inserts fits various sizes of holders.

*Two* Save vitally needed critical steel and release it for other war time users.

*Three* Increase bit life due to the float between insert and holder, allowing for easier direct alignment with recess in screw.

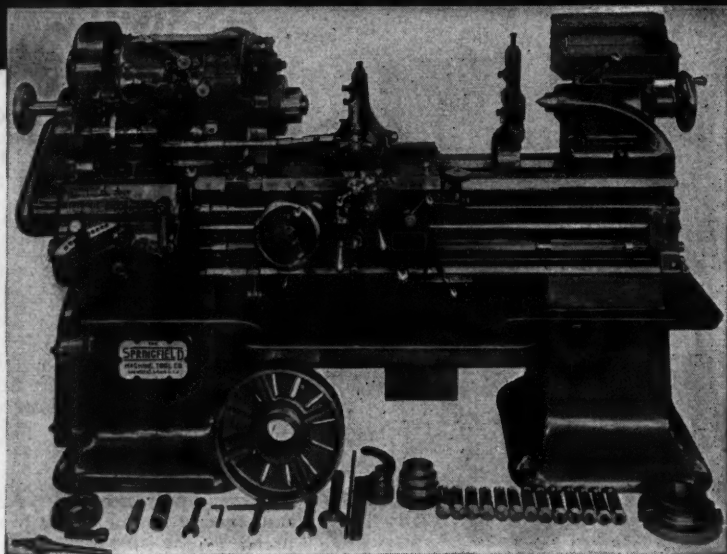
*Four* Decrease handling cost of screw driver bits because it is no longer necessary to return screw drivers for reconditioning as cost of inserts is approximately that of the reconditioning charge.

Send for Bulletin No. 102 giving complete details.

# APEX

THE APEX MACHINE & TOOL COMPANY • DAYTON, OHIO  
Manufacturers of Power Bits for Phillips, Slotted Head and Clutch Head Screws; and Hand Tools for Phillips and Clutch Head Screws.

## PRECISION and LONG LIFE



SPRINGFIELD Precision LATHES fill the munitions makers' demands for (1) extreme accuracy and (2) maintenance of this accuracy and long life.

Here are some of the factors that account for the sustaining of the original accuracy built into each Springfield Lathe:

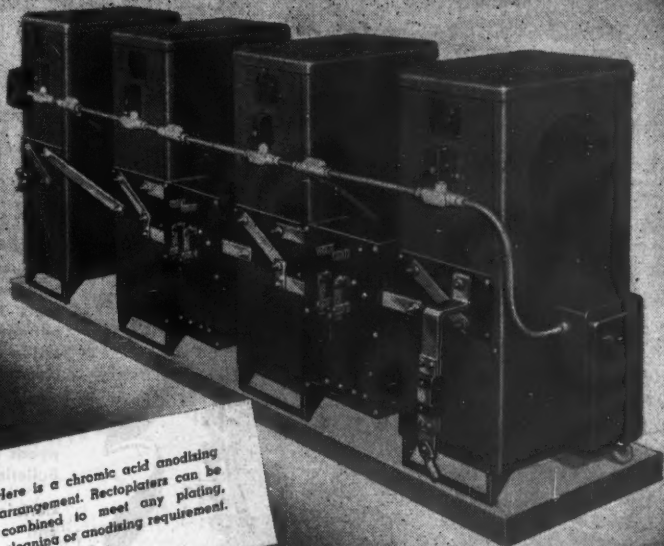
HEADSTOCK . . . 12 speeds . . . only half of the easy-shifting spur gears mesh at one time. APRON . . . extra heavy . . . operates on ball and bronze bearings throughout. TAIL-STOCK . . . all bearings and bed ways oiled from one well.

The SPRINGFIELD LATHE is an outstanding value for both tool room and quantity production use. Write for Bulletin 162.

**THE SPRINGFIELD MACHINE TOOL CO.**  
SPRINGFIELD OHIO

# Mr. Subcontractor:

YOU'LL BE NEEDING EXTRA AMPERES  
TO MEET INCREASED PRODUCTION DEMANDS!



Here is a chromic acid anodizing arrangement. Rectoplaters can be combined to meet any plating, cleaning or anodizing requirement.

**W**HEN you are asked to double your output over night. When the walls of your present quarters already bulge from crowding and expansion is impossible. When you can't possibly squeeze in more bulky machinery—and you need those extra amperes **FAST**. THAT'S A JOB FOR UDYLLITE-MALLORY RECTOPLATERS.

Rectoplaters are small, compact units, standardized in design and production, tested by

years of actual service in plants all over the country. Each unit delivers 1440 amps at 6 volts or 720 amps at 12 volts. They are easily moved wherever needed, require little floor space and no special installation.

Rectoplaters may be used individually or in series when greater amperage is required. They require no conversion for peacetime use.

(RECTOPLATERS ARE IN STOCK FOR IMMEDIATE DELIVERY)

## THE UDYLLITE CORPORATION

Chicago 12  
1341 Wabash Street

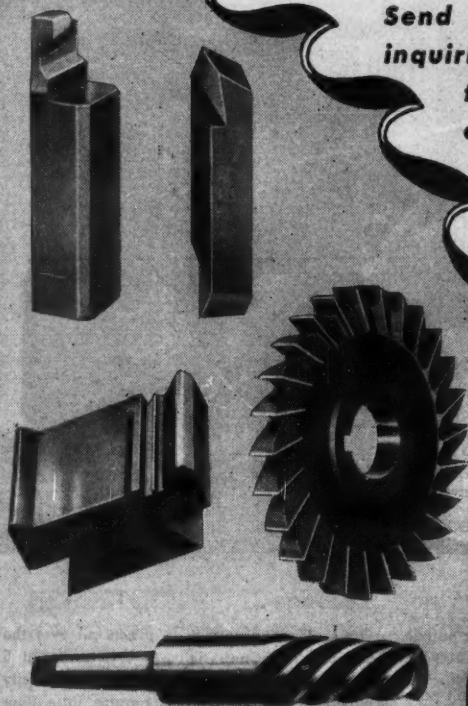
1551 E. Grand Blvd., Detroit 11, Mich.

Long Island City 1, N. Y.  
11 16 44th Drive

Cleveland 3  
4408 Carnegie Ave.

# HEADQUARTERS for SPECIAL CUTTING TOOLS

*Send your special cutting tool inquiries to A.C.E.—headquarters for cutting tools made to customer's prints.*



We have modern machinery and equipment, modern methods, trained operators and the "Know How" to turn out special cutting tools that meet your requirements in accuracy, precision and workmanship. Note: We make no tools for stock.

Send us your immediate needs for prompt inquiries. Bulletin on request.

Certain desirable territories still available for active representatives.

**AMERICAN CUTTER  
& Engineering Corp.**

31741 Mound Road,  
Warren, Mich.

## AMERICAN CUTTER AND ENGINEERING CORP., WARREN, MICH.



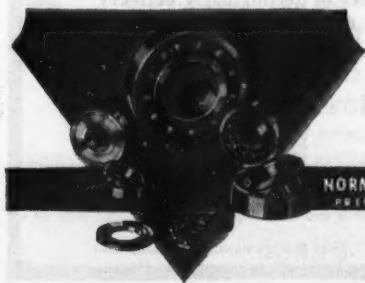
# ★ HELPING AMERICA PRODUCE MORE! ★



**THAT'S WHAT  
NORMA-HOFFMANN  
FIELD ENGINEERS  
ARE DOING, TODAY**

*Write for the Catalog.*  
**Let our engineers work with YOU.**

★ They're out on America's "production fronts," giving freely of their highly specialized experience, assisting manufacturers of armament, equipment, munitions and supplies in keeping production lines moving. They're aiding **MACHINE BUILDERS** to apply anti-friction bearings more economically and efficiently. They're helping **MACHINE USERS** to get the most from the bearings they have—to lengthen their life—to reduce shut-down hazards. At our factory, The Engineering and Research Departments are equally busy, solving problems in bearing application, operation and maintenance submitted by buyers of bearings in every field. And all this service is being rendered without cost. **THAT AMERICA MAY PRODUCE MORE.**



**NORMA-HOFFMANN BEARINGS CORP'N, STAMFORD, CONN., U.S.A.**  
PRECISION BALL AND ROLLER BEARINGS

**BUY MORE UNITED STATES WAR BONDS, TODAY**



## Production at New Peak on JOHANSSON GAGE BLOCKS

*Deliveries on Priority Basis Now Being Made  
With Less Delay Than Formerly*

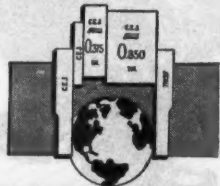
**R**EQUIREMENTS of extreme manufacturing precision in war industries of the United Nations have made unprecedented demands upon our output of Johansson Gage Blocks, and we regret that our customers have had to wait so long for delivery even though every order is on priority.

Today, we are happy to announce that increased manufacturing facilities have stepped up pro-

duction to the highest peak in history and the period of waiting for deliveries has been greatly reduced. Yet production must always be limited by the accuracies to which these blocks are built. Even now, it is not possible to promise immediate deliveries. But it is smart to place your order now. If it is on file, your chances of getting early delivery are a great deal better than they have been heretofore.

### JOHANSSON GAGE BLOCKS AND ACCESSORIES

Ford Motor Company, Johansson Div.  
Dept. MM9 Dearborn, Michigan

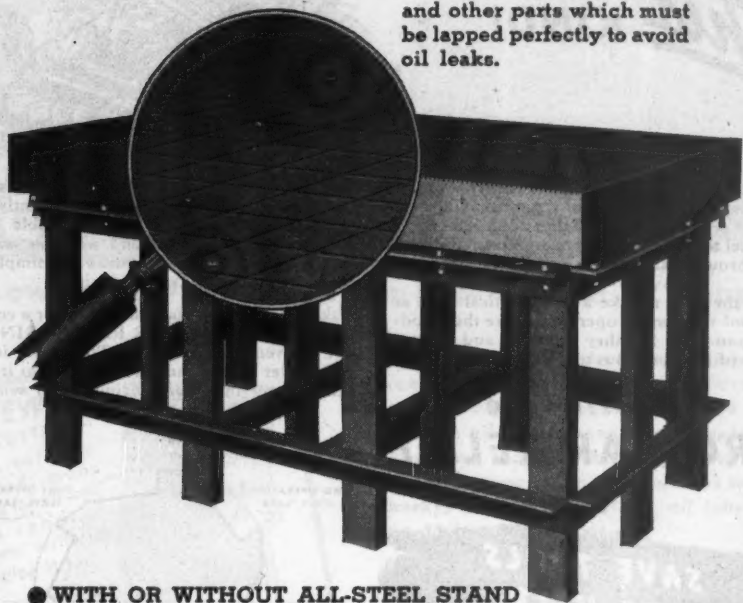


World's Standard of Measurement

# USE CHALLENGE LAPPING PLATES

BACKED BY FIFTY YEARS OF QUALITY MANUFACTURING

**CHALLENGE LAPPING PLATES** meet the exacting demands of **ACCURACY** and **LONG, TROUBLE-FREE LIFE**. Specifically designed to assure perfect fit when lapping metal-to-metal joints on which no sealer is used. Ideally suited for use on crank cases, cylinder heads, end bells, gear housings and other parts which must be lapped perfectly to avoid oil leaks.



● **WITH OR WITHOUT ALL-STEEL STAND**

Made of finest semi-steel, specially heat treated and carefully machined.  $\frac{1}{10}$ " grooves  $\frac{1}{2}$ " apart run full length and width of the surface. The arc-welded stand is optional. Equipped with closely spaced lock leveling screws assuring perfect level at all times. Wide range of surface sizes from 24"x36"x4" to 36"x72"x6".

**INVESTIGATE BEFORE YOU INVEST . . .**  
and write for complete details.

455



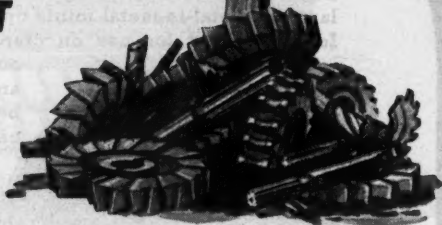
## THE CHALLENGE MACHINERY CO.

GRAND HAVEN • MICHIGAN

*America needs*

**SCRAP**

**...BUT NOT  
*this* KIND!**



These days the hungry mouths of America's blast furnaces can use every bit of scrap iron and steel they can get—and more. But they don't want good tool steel that has ended prematurely on the junk heap through carelessness and faulty grinding.

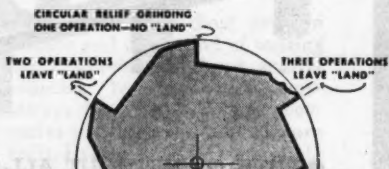
Now's the time to take a good critical look at your tool-sharpening operations. Are they modern, up-to-date? Do they conserve and protect the life of your precious tools?

**Grind the  
CIRCULAR RELIEF  
way**

**SAVE TOOLS  
TO HELP  
SAVE AMERICA**

**CIRCULAR RELIEF GRINDING** makes tools last longer because it sharpens efficiently without needlessly cutting away valuable metal. Moreover, tools are ground with *one machine*, in *one operation*—an operation so simple that inexperienced men can handle it.

Take a look at the diagram below for a comparison between **CIRCULAR RELIEF GRINDING** and conventional methods. Then send for our free folder telling the whole story. Do it *today*. Start conserving your precious tools *now*!

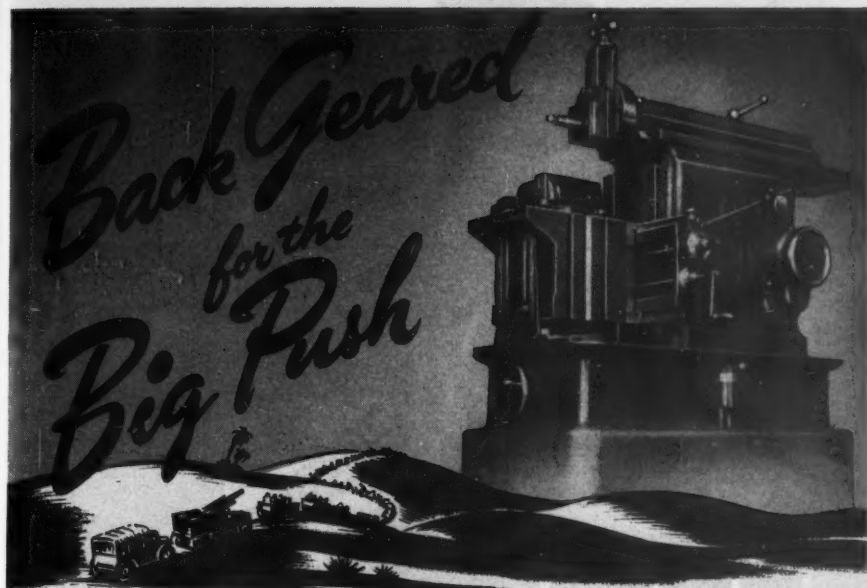


Comparing **CIRCULAR RELIEF** With Conventional Grinding  
Note how **CIRCULAR RELIEF GRINDING** follows the curve of the tool, grinds right up to the cutting edge, and does not cut away valuable metal supporting the cutting edge.

**CLEVELAND**  
**TOOL ENGINEERING COMPANY**

9106 DETROIT AVE.

CLEVELAND, OHIO



## The Low Priced Vernon Precision Back-Geared 12" Shaper

**NEW!**  
CAL-CUTTERS—  
New, carbide-  
tipped, many  
types for all mill-  
ing require-  
ments! Write for  
catalog M-1.



Hyper Mill Cal-  
Cutter with neg-  
ative rake for  
machining steel,  
illustrated.

Here's wise production strategy for improv-  
ing tool room precision and production  
line output: Get an economical Vernon 12"  
Shaper with all the engineering advantages  
of expensive shapers. Accuracy, long life  
and important operating conveniences tailor  
this husky, **LOW COST** tool for all jobs re-  
quiring 12" stroke or less.

**FEATURES:** Back-geared for slow, powerful  
strokes • Helical Bull Gear and Pinion (adjust-  
able) for smoothness • Anti-friction bearings  
throughout add years to life • Variable speed  
control provides flexibility • Tapered gibs gain  
rigidity • Automatic cross feeds provide for  
smooth, effortless cuts • Many other worthwhile  
features demand your inspection! Folder sent  
free—write for your copy!



**MACHINERY MANUFACTURING COMPANY**

1918 EAST 11<sup>TH</sup> ST. VERNON, LOS ANGELES, CALIFORNIA

*Vernon Line of*

**HORIZONTAL MILLS, VERTICAL MILLS and  
JIG BORERS, SHAPERS and GRINDERS**



# Lubrication...

In tapping, plenty of good lubrication is highly important for best results and long tap life. Soft steel, cold rolled steel, and screw stock (usually considered free-cutting), require high grade lubrication when tapping threads. The sulphur bearing oils are excellent here.

Aluminum in its purer state requires a thin lubricant. If much alloy is present (especially zinc), a heavier lubricant should be used. Paraffin oil is a good lubricant for Aluminum. Also carbon tetrachloride.

Copper and copper alloys need good lubrication for smooth threads. Sulphur-bearing oils—If staining is not a factor.

Soluble oils and water should NOT be used when threading tough metals. Mineral oils should never be used—Animal or vegetable oils are far better.

For tap conservation—Lubricate Freely!

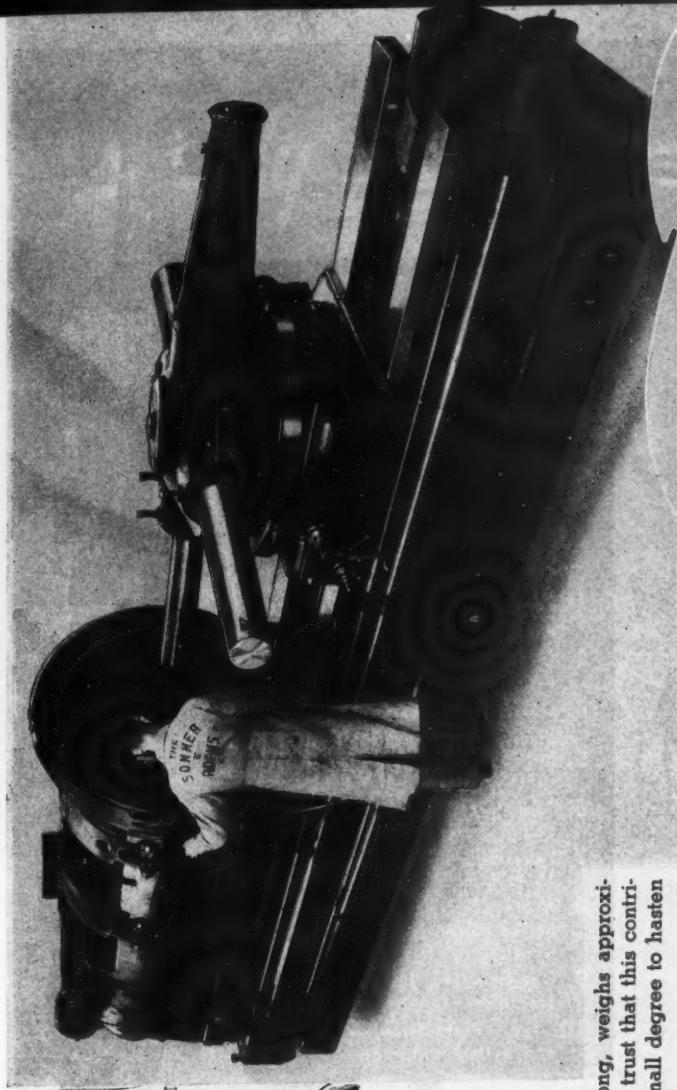
A DIVISION OF  
**THE NATIONAL TWIST DRILL & TOOL CO.**  
DETROIT, MICHIGAN

# Winter Brothers

COMPANY  Wrentham, Massachusetts, U.S.A.



Typical of special equipment designed and built by Sommer & Adams is this large boring and thread milling machine, which handles those operations on the breech rings of 5" guns. It is 22 feet long, weighs approximately 60,000 pounds. We trust that this contribution may help in some small degree to hasten the coming of final peace.

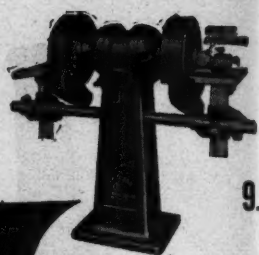
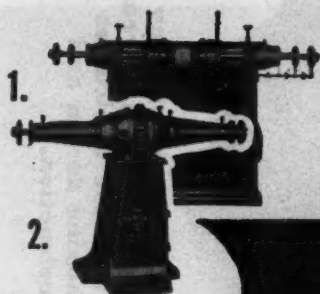


The Sommer & Adams Company places at your command a 25-year acquaintance with the intricacies of special machine design and construction.



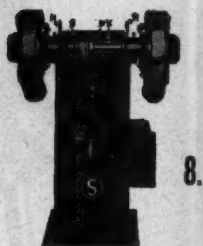
THE SOMMER & ADAMS COMPANY  
18311 EIGHT AVENUE  
CLEVELAND, OHIO

*Custom-Built EQUIPMENT FOR MANY PURPOSES*



*It's*  
**STANDARD GRINDERS**  
*for*  
**PRODUCTION • ECONOMY**

- 1.-2. Buffers, Polishers,  $\frac{1}{2}$  H.P. to 25 H.P. Direct and Belted motor drive.
3. Carbide Tool Grinders, wet or dry. Twelve models.
4. Double End Wet Grinders, 12" to 24" diameter wheels.
5. Speed lathes. All types and sizes.  $\frac{1}{2}$  H.P. to 5 H.P.
6. Tool Post Grinders, direct and belted motor drive.
7. Pedestal Grinders,  $\frac{1}{4}$  H.P. to 15 H.P.
8. Multiple Speed Grinders, belted motor drive. 10" to 30" wheels.
9. Disc Grinders, 10" to 30" diameter discs.
10. Tool Post Grinders, direct and belted motor drive.



*The* **STANDARD ELECTRICAL TOOL Co.**


CINCINNATI • OHIO

WRITE FOR  
 CATALOG 43.

496 RIVER ROAD

# *Specify* CLEVELAND'S

WE CAN FURNISH YOU  
WITH PUNCHES AND DIES  
TO FIT ANY MAKE OF  
PUNCHING MACHINE



399 sizes of these standard punches  
241 sizes of these standard dies  
carried in stock for immediate shipment  
as shown on accompanying ready reference tag

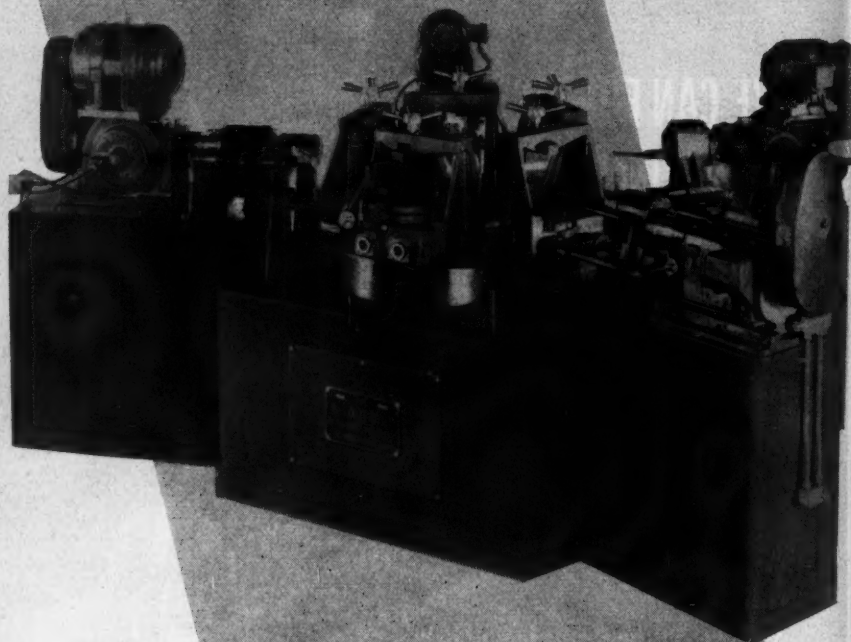
*Write for Small Tool  
Hand Book*

When you need Punches and Dies or other Small Tools such as  
Chisel Blanks, Coupling Nuts, Rivet Sets, Shear Blades, etc. specify  
Clevelands and your order will be shipped without delay.

***Small Tools*** THE CLEVELAND PUNCH & SHEAR WORKS COMPANY *Cleveland, Ohio*  
NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • PITTSBURGH

# Bradford

## DRILLING UNITS



1840 • 1943

Bradford Drilling Units can be furnished for a multiplicity of versatile applications. Complete machines can be supplied for special automatic and semi-automatic work to meet production operations within the capacity of the drilling units.

Bradford engineers will gladly assist in any problems of production involving drilling and tapping—they are specialists in this field.

Write for illustrated folder giving further information on the Bradford Drilling Units.

# THE Bradford Machine Tool CO.

EVANS AT EIGHTH ST.

CINCINNATI, OHIO

**OTC****MACHINE  
MAINTENANCE****TOOLS**

*Did You Say*  
**SPECIAL Wrenches?**

OTC specializes in tools for machine and plant maintenance—heavy duty box wrenches, pullers, push-pullers, giant slugging wrenches and special tools to order. OTC commitments to U. S. Armed Forces allow only for high priority needs.

Write for Bulletin P. E. 1943.

This OTC Marine  
Wrench is 6 ft.  
long, has 12<sup>3</sup>/<sub>16</sub>"  
opening,  
weighs 800  
lbs.



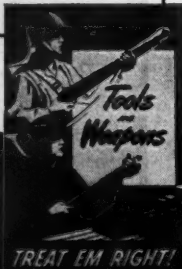
**OWATONNA  
TOOL COMPANY**  
OWATONNA, MINN.

**Lost TIME may mean Lost LIVES!**



**ABRASIVE COMPANY**  
Standard Specifications  
Tool Room Grinding Wheels

| Job  | Standard Wheel | No. 18 Density Wheel |
|--|----------------|----------------------|
| Broaches   | W60-J-KT       | W60-L-M18            |
| Cutters  | W46-K-KT       | W60-L-F18            |
| Die Stocks   | W46-G-KT       | W60-S-L18            |
| Drills—  |                |                      |
| Small  | 60-M-DT        |                      |
| Large  | 36-M-DT        |                      |
| Gears  | W60-L-E8       | W60-L-F18            |
| Hobs   | W60-L-E8       | W60-L-M18            |
| Machine Shops—   |                |                      |
| General Oil-hand   | 46-M-DT        |                      |
| Bore   | W46-L-KT       | W60-L-M18            |
| Ball Cutters   | W46-L-KT       | W60-L-M18            |
| Tools—Lathes and   |                |                      |
| Planes   | 46-M-DT        |                      |
| Light Offhand  | 46-M-DT        |                      |
| Heavy Offhand  | 46-M-DT        |                      |
| Heavy—Large  | 30-C-D9        |                      |
| Wheels   |                |                      |
| Flange Grind-  | W46-L-KT       | W60-L-M18            |
| ing  |                |                      |
| Tungsten Carbide   |                |                      |
| Tools—Offhand  |                |                      |
| Roughing   | G80-L-V8       |                      |
| Semi-Finishing   | G80-H-V8       |                      |
| Finishing  | G120-H-V8      |                      |
| No. 18 Density—Open, Porous Wheel with wide grain spacing. |                |                      |



## FOR BEST RESULTS FOLLOW THESE SUGGESTIONS

- 1 Sharpen tools and cutters frequently**  
The waste of critical alloy steel resulting from infrequent regrinding is enormous because so much of the tool has to be ground away to renew the cutting edge.
- 2 Dress and true the grinding wheel**  
Dress frequently enough to retain correct wheel shape and to keep the abrasive cutting particles clean and exposed for most efficient grinding action. Excessive dressing, however, wastes the grinding wheel.
- 3 Use the best grain and grade of wheel for your job**  
ABRASIVE COMPANY "white" and "red" tool room grinding wheels have been standard for many years for all types of tool and cutter grinding. For exceptionally fast and cool grinding action on heat sensitive alloy steels specify the newer "No. 18 Density" wheels with open, wide-spaced porosity.

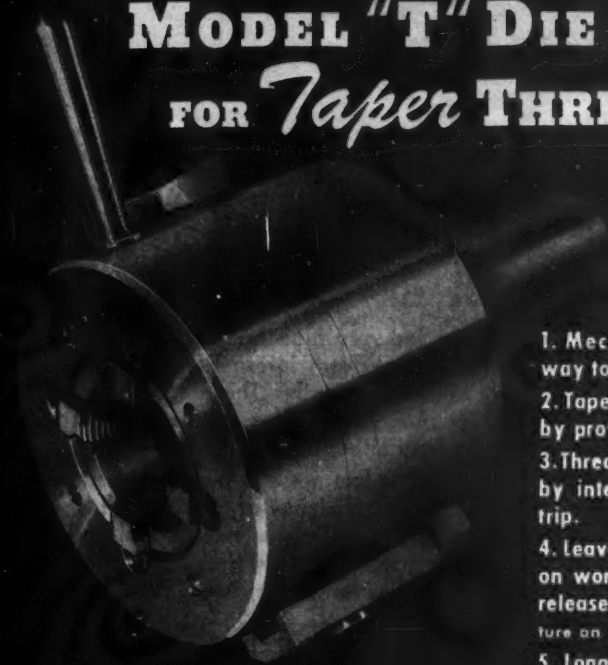
## ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.  
TACONY & FRALEY STS., PHILADELPHIA 37, PA.

Distributors in all principal cities

# Rickert FOR 35 YEARS Shafer

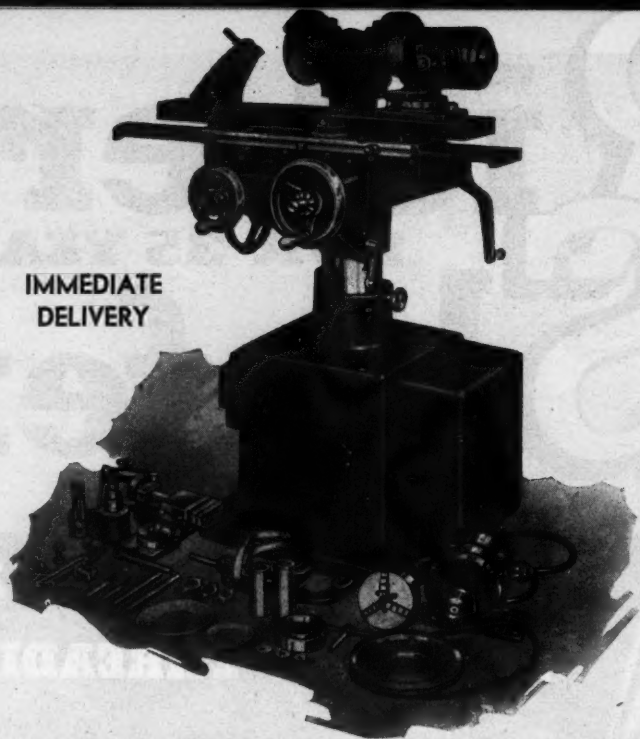
## MODEL "T" DIE HEAD FOR *Taper* THREADING



1. Mechanically correct way to cut taper threads.
2. Taper controlled exactly by profiles on outside.
3. Thread length controlled by internal or external trip.
4. Leaves no chaser marks on work when Die Head releases (an important feature on aircraft threads).
5. Longer chaser life.

**RICKERT-SHAFER CO. • ERIE, PA.**  
DIE HEADS • COLLAPSIBLE TAPS • BORING HEADS  
TAPPING MACHINES • SPECIAL THREADING MACHINES

**IMMEDIATE  
DELIVERY**



## **G. R. No. 1½ TOOL AND CUTTER GRINDERS for perfect tool sharpening**

Designed to meet the demand for very high quality machines, these Grand Rapids Universal grinders perform internal, surface and tool grinding quickly, accurately and conveniently. These machines can be operated from either front or rear. Transverse, vertical and longitudinal movements can be made from either position.

Grand Rapids Tool and Cutter Grinders make it possible to perfectly sharpen and insure maximum cutting efficiency of gear cutters, formed cutters, angle cutters, face mills, end mills, side mills, spiral and plain milling cutters, thread chasing tools, reamers, hobbbs, etc. Bulletin 9-1-41 gives complete information. Prompt Delivery.

**GALLMEYER & LIVINGSTON CO.**

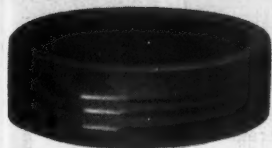
308 STRAIGHT AVE. S. W.

GRAND RAPIDS 4 MICHIGAN

## USE BLANCHARD WHEELS ON BLANCHARD GRINDERS



**MATERIAL**  
Nickel Cast Iron  
**WHEEL**  
220C10  
**FINISH**  
6 Micro inches  
**LIMITS**  
Flat  
**PRODUCTION**  
one every 5 minutes  
(one side) removing  
.010 inches stock



BLANCHARD CYLINDER WHEEL

*Clutch Pressure Plate Ground  
on No. 11 Blanchard Surface  
Grinder*

Blanchard has made rapid strides in securing fine finishes from Blanchard Grinding Wheels. Finishes as fine as  $1\frac{1}{2}$  micro inches are obtained when Blanchard Wheels are

used. The finish produced on cast iron is so fine, wheel marks disappear bringing out the grain in the iron. Parts are now being ground that were formerly lapped.

Experience shows that Blanchard Wheels with "C" abrasive in grain sizes of 80 to 220 give best results in producing fine finishes regardless of the kind of material being ground.

For fine finishes on cast iron use wheels — 80C10, 100C10 or 220C10, on hardened steel use wheels — 80C20, 100C20 or 220C10. In a few instances a slight variation from these grades may be necessary depending on the area of the surface to be ground.

For most efficient operation of Blanchard Surface Grinders specify Blanchard Wheels.



*The Booklet "Blanchard Wheels" contains helpful information on the selection of grinding wheels for all kinds of work — sent free on request.*



*The* **BLANCHARD** MACHINE COMPANY

64 STATE STREET, CAMBRIDGE, MASSACHUSETTS

# Stepping Up... and Keeping Up the STEEL CUTTING PRODUCTION of the United Nations

IN ENGLAND

IN RUSSIA

IN CANADA

IN SOUTH AMERICA

AND THROUGHOUT THE UNITED STATES



IN CHINA

IN INDIA

IN AFRICA

IN MEXICO

IN AUSTRALIA

**W**ITH the outbreak of war in 1939, the Allied Nations—abruptly cut off from Germany as a principal source of supply for carbides—diverted the full flood of their carbide demands to the United States.

Fortunately, American industry had established—as far back as 1928—its own independent sources of supply. These American suppliers were ready to meet the emergency with a background of 10 years' experience in the development, manufacture and application of this urgently needed material. They had the skill, the equipment, and a generous margin of reserve capacity.

Today, you will find carbides a factor of vital importance in stepping up and keeping up the production of not only the United States but also such countries as England, Russia, Australia, Canada, China, India, Mexico and many others among the United Nations.

The full extent to which carbides are being used in the cause of victory is difficult to visualize. Carboloy Company production alone, for example, is at an annual rate 45 times greater than that of any pre-war year. Monthly production of carbides—formerly measured in pounds—can to-

day be expressed in tons—many tons per month! Yet the average carbide tool contains but a fraction of an ounce of carbide at the cutting edge—and a single tool during its usable life machines hundreds of parts for the implements of war.

A high order of performance—so high as to have been once considered incredible—is now commonly expected, and obtained, with carbides. Such things as increases in output of 3 to 1, lengthened tool life of 10 to 1, finish cuts that eliminate arduous grinding, machining of former "non-machineable" alloys, reductions of 25%, 50%, 75% in machining costs—results such as these are every-day occurrences in war production today.

This widespread use of carbides in war, indicates a new era of production economy when normal commerce returns. Manufacturers who have converted to carbides to meet the present emergency will then have at their immediate disposal an economic weapon of unusual advantage in seeking world markets.

**Carboloy Company, Inc., Detroit, Mich.**

Authorized Distributors:

Canadian General Electric Co., Ltd., Toronto

Foreign Sales:

International General Electric Co., Schenectady, N. Y.



# CARBOLOY

TRADEMARK



TITANIUM — TANTALUM — TUNGSTEN CARBIDES